BULLETIN OF MISCELLANEOUS INFORMATION No. 6 1940
ROYAL BOTANIC GARDENS, KEW

XXIX—A REVISED LIST OF GOLD COAST FUNGI AND PLANT DISEASES.*

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For many early Gold Coast records we are indebted to two amateur collectors, both of whom were Kew students. W. H. Johnson was Curator of Aburi Botanic Gardens, and afterwards Director of Agriculture, from 1898 to 1906; T. H. Hunter, Superintendent of Agriculture, for several years in charge of the Agricultural and Forestry Training Centre, Kumasi, served from 1911 till 1930. In the enervating climate of West Africa few men have the energy for spare time occupations, and in Johnson's and Hunter's times conditions of life were far worse than they are now. Their collections, therefore, represent much more disinterested effort and unusual activity of mind and body than mycologists at home might imagine.

Both Johnson's and Hunter's collections, which are marked in this list " J " and " H," respectively, were composed mainly of the woody polypores, and few of their records have been duplicated by later mycologists, whose time and interest have been centred on economic problems. Johnson's collections are represented in the Gold Coast by only a few rather inadequate drawings, the specimens and notes having been sent to G. Massee at Kew. On this material Massee erected a number of new species, and sent to the Gold Coast certain names which have remained nomina nuda.

Hunter sent his collections to C. G. Lloyd. The material is no doubt well preserved in the Lloyd Museum, now at the Bureau of Plant Industry, Washington, U.S.A. Hunter's duplicates are now stored at Aburi, but many of them were in poor condition when received there.

Organised phytopathological research began with the appointment of R. H. Bunting in 1915. Until 1921 he was engaged in administration, and had little opportunity and no laboratory facilities for technical work. Despite these difficulties he recorded during this period a number of fungi (marked " B " in the list) and diseases of economic importance, and by much arduous trekking and study of local conditions laid the foundations of economic mycology in the Gold Coast. Bunting was fortunate in having for his Kew correspondent Miss E. M. Wakefield, who dealt with much of his material, and has continued to assist us from time to time.

* A preliminary list appeared in "Gold Coast Plant Diseases," R. H. Bunting and H. A. Dade, 1925.

In 1921 a laboratory was built and Bunting was freed to devote his time to mycology. The writer joined him at this time. After seven years of great activity Bunting left, in 1928, to work at the Stored Products Laboratory at Slough, where he continued to afford much assistance in our work on storage problems until 1931.

The writer served in the Gold Coast as mycologist until his appointment to the Imperial Mycological Institute in 1935, when he was succeeded by W. F. Steven, who in turn was followed in 1937 by E. F. S. Shepherd. F. C. Deighton, of Sierra Leone, was seconded to the Gold Coast for some months in 1937 and made a large collection, including many rusts and sooty moulds.

Since 1921 Messrs. S. F. Ashby, E. W. Mason and G. R. Bisby, of the Imperial Mycological Institute, have assisted in the identification of material.

Part I.

(An asterisk preceding the name of an organism indicates that the species was erected on a Gold Coast collection. Citations of literature which follow asterisked names refer to original descriptions. Other citations are of publications on Gold Coast material or problems. Numbers preceding hosts or substrata are those of the Gold Coast Case Record.)

FUNGI

Phycomycetes

Absidia capillata *Van Tiegh.* 478 *Theobroma cacao,* throughout rain forest, a common mould of prepared cacao. Bull. 16, Gold Coast Dept. Agr., 54 (1929).

—— **regnieri** (*Lucet et Cost.*) *Lendner.* 479 *Theobroma cacao,* throughout rain forest, a common mould of prepared cacao. Bull. 16, Gold Coast Dept. Agr., 54 (1929).

*——**cristata** *Dade* in Trans. Brit. Mycol. Soc. **21,** 26 (1937). 554 *Manihot utilissima,* Aburi; *Theobroma cacao,* Kpeve. Following anthracnose on cassava stems; rare on prepared cacao.

——**truchisi** (*Lucet et Cost.*) *Lendner.* 556 *Theobroma cacao,* widespread, an uncommon mould of prepared cacao. A strain with large spores (5–7×3–5μ), thriving at 47–50°C.

Choanephora cucurbitarum (*Berk. et Rav.*) *Thaxter.* 476 *Carica papaya* leaves; flowers of *Boerhaavia diffusa, Crotalaria retusa, Hibiscus rosa-sinensis,* etc.; *Daucus carota* following bacterial rot; *Theobroma cacao* husks and prepared cacao. Ubiquitous. Common on decaying vegetable matter. One collection was intermediate between *C. cucurbitarum* and *C. infundibulifera.* Bull. 16, Gold Coast Dept. Agr., 250 (1929).

Circinella spinosa *Van Tiegh. et Le Monn.* 488 *Theobroma cacao*, throughout rain forest, a common mould of prepared cacao. Bull. 16, Gold Coast Dept. Agr., 53 (1929).

Cunninghamella echinulata (*Thaxter*) *Thaxter.* 622 in soil, Aburi-Afwerase.

***Mucor buntingii** *Lendner*, in Bull. Soc. Bot. Genève, Sér. 2 (1930). (=*M. pusillus* Lindt teste Zycha in *Kryptogamenflora der Mark Brandenburg*, **6a**, 51–52 : 1935.) 463 *Theobroma cacao*, throughout rain forest. 490 *Cocos nucifera* (Copra), Keta. A thermophil thriving in fermenting cacao and occurring also in inadequately dried cacao "beans." Bull. 16, Gold Coast Dep. Agr., 47, 74–100 (1929).

*—— **inaequisporus** *Dade*, in Trans. Brit. Mycol. Soc., **21**, 24 (1937). 637 *Spondias mombin*, Aburi, on rotting fruits.

—— **javanicus** *Wehmer.* 584 *Theobroma cacao*, Aburi, mould of prepared cacao.

Physoderma maydis *Miyabe.* 161 *Zea mays*, widespread, "Brown spot" of leaves and nodes, sometimes destructive. Bull. 10, Gold Coast Dept. Agr., 10–12 (1928), as *P. zeae-maydis* Shaw.

Phytophthora palmivora (*Butl.*) *Butl.* B133 *Theobroma cacao*, throughout forest zone, "Black pod" disease, widespread and destructive, and cushion canker. Gold Coast Dept. Agr. Bull. 6, (1927) ; 13, pp. 85, 89 (1928) ; 16, p. 135 (1929) ; 23, pp. 109, 122 (1930) ; Trans. Brit. Mycol. Soc., **14**, 18 et seq. (1928). B116 *Hevea brasiliensis*, Aburi, fruit rot. 117 *Mimusops* (?) *elengi*, Aburi, fruit rot. A strain distinct from, and sexually complementary to, that on cacao. Bull. 13, Gold Coast Dept. Agr., 89 (1928) ; Trans. Brit. Mycol. Soc., **14**, 18 et seq. (1928).

—— **parasitica** *Dastur.* 529 *Cyphomandra betacea*, Aburi, root rot. Bull. 23, Gold Coast Dept. Agr., 250 (1930).

—— —— var. **nicotianae** (*Breda de Haan*) *Tucker.* 1007 *Nicotiana tabacum.*

Plasmopara viticola (*Berk. et Curt.*) *Berl. et de Toni.* 991 *Vitis vinifera*, Koforidua.

Pseudoperonospora cubensis (*Berk. et Curt.*) *Rostow.* 329 *Cucumis sativus*, Aburi, leaf blight.

—— sp. 809 *Cassia occidentalis*, Obosomase.

Pythium aphanidermatum (*Edson*) *Fitzp.* 69 *Nicotiana tabacum*, Kpedsu & Kumasi, stem burn. 310 *Xanthosoma sagittifolium* ; 505 *Colocasia antiquorum*, secondary to root rot. Bull. 23, Gold Coast Dept. Agr., 184 (1930).

Pythium sp. aff. **gracile** *Schenk.* 505 *Xanthosoma sagittifolium*, Dunkwa.

Rhizopus nigricans *Ehrenb.* 489 *Cocos nucifera*, Aburi, mould on inadequately dried copra; 566 *Manihot utilissima*, Keta, mould on inadequately dried "Kokonte" (sun-dried tuber); 684 *Artocarpus integer*, Aburi, fruit rot (as an active pathogen). The correct name and citation for *R. nigricans* are uncertain.

—— **nodosus** *Namysl.* 566 *Manihot utilissima*, Keta, mould on inadequately dried "Kokonte."

Sclerospora graminicola (*Sacc.*) *Schroet.* B136 *Pennisetum typhoides*, throughout savannah, "green ear" disease. Bull. 10, Gold Coast Dept. Agr., 36 (1928).

Syncephalastrum cinereum *Bain.* 543b, *Theobroma cacao*, Kpeve, a common mould of prepared cacao; 592a *Cocos nucifera* (copra), Keta.

***syncephalis nana** *Dade* in Trans. Brit. Mycol. Soc., **21,** 21, 1937. 570 parasitizing *Absidia regnieri* on *Theobroma cacao*, Kpeve.

***Trachysphaera fructigena** *Tabor et Bunting* in Ann. Bot., **37,** 156 (1923). 49 *Coffea liberica*, 66 *Theobroma cacao*, throughout rain forest, causing "mealy pod" disease of cacao and of Liberian coffee fruits and twigs. Bunting & Dade, Gold Coast Plant Diseases, 31, 55 (1925). 50 *Persea gratissima*, Afwerase, as a wound parasite on fruit. 573 *Citrus paradisi*, Aburi, following fruit-moth punctures.

Woroninella dolichi (*Cooke*) *Syd.* 656 *Vigna unguiculata*, Kumasi, false rust.

ASCOMYCETES

Hemiascomycetes

Arachniotus ruber (*Van Tiegh.*) *Schroet.* J, on cat's excreta, Aburi. Ann. Bot., **16,** 62 (1902).

***Hansenula** sp. (n. sp. sec. *A. J. Kluyver et J. Lodder*). 533 *Theobroma cacao*, Aburi, in fermentation mass.

***Klöckeria** sp. (n. sp. sec. *A. J. Kluyver et J. Lodder*). 533 *Theobroma cacao*, Aburi, the first yeast to appear in the fermentation process.

Mycoderma sp. 533 *Theobroma cacao*, Aburi, in the fermentation mass. A nearly identical strain occurs in fermenting palm-wine (from *Elaeis guineensis*).

Mycotoruloides sp. 533 *Theobroma cacao*, Aburi, the predominant yeast in cacao fermentation. A nearly identical strain occurs in fermenting palm-wine (from *Elaeis guineensis*).

*Myxotrichum **johnstoni** *Massee et Salmon* in Ann. Bot., **16,** 64 (1902).

Saccharomyces cerevisiae *Meyen ex Hansen,* strain. 533 *Theobroma cacao,* Aburi, isolated from trial fermentations. Produces rapid fermentation at high temperature, and high quality product.

—— —— var. **ellipsoideus** (*Hansen*) *Dekker.* 533 Fermenting palm-wine (from *Elaeis guineensis*), Aburi. One of the predominant yeasts in palm-wine fermentation, and in bread making, for which palm-wine is used in the Gold Coast.

Pyrenomycetes

*Angiotheca **scabra** *Syd.* in Ann. Mycol., **37,** 214 (1939). 786 *Antiaris africana,* Aburi.

Aspergillus† **candidus** *Link ex Fr.* 543 *Theobroma cacao,* Kpeve, internal mould of prepared cacao. 601 on vegetable lard, Aburi.

—— **carbonarius** (*Bain.*) *Thom.* 441 *Theobroma cacao,* Aburi, internal mould of prepared cacao.

—— **chevalieri** (*Mangin*) *Thom et Church.* 464 *Theobroma cacao,* 492 *Cocos nucifera,* 601 Vegetable lard, ubiquitous. A common mould of prepared cacao, copra, and other produce, thriving on material of relatively low water content, and therefore of special significance. Bull. 16, Gold Coast Dept. Agr., 56, 74–100 (1929).

(—— **cinnamomeus** *Schiem.*—See note on *A. niger.*)

—— **elegans** *Gasp.* 589 Contaminant in culture, Aburi. 601b on vegetable lard, Aburi.

—— **fischeri** *Wehmer.* 545 *Theobroma cacao,* Aburi, internal mould.

—— **flavipes** (*Bain. et Sart.*) *Thom et Church.* 588 *Theobroma cacao,* Aburi, internal mould of prepared cacao.

—— **flavus** *Link ex Fr.* and its var. **rufus** *Blochw.* 35 *Theobroma cacao,* throughout forest zone, a very common internal mould of prepared cacao. Bull. 16, Gold Coast Dept. Agr., 51 (1929). 567 *Cocos nucifera,* Keta, mould on copra. 547 *Butyrospermum parkii,* Tamale, mould in kernels. 506 *Locusta migratoria migratorioides,* widespread, as an active pathogen. Bull. 23, Gold Coast Dept. Agr., 248 (1930).

† Following Wehmer, Thom & Church, Blochwitz, *et alia,* the generic name *Aspergillus* is maintained for the whole group, including species with perfect stages.

Aspergillus† fumigatus *Fresen.* 111 *Theobroma cacao*, throughout forest zone, generally present in native cacao fermentation masses, and penetrating testae of " beans," initiating internal moulding. Bull. 16, Gold Coast Dept. Agr., 45, 74–100 (1929).

—— **gracilis** *Saito.* 565 *Theobroma cacao*, Kpeve, internal mould of prepared cacao.

—— **insuetus** (*Bain.*) *Thom et Church.* 576 *Theobroma cacao*, widespread, internal mould of prepared cacao.

—— **japonicus** *Saito.* 609 Contaminant in culture, Aburi.

—— **niger** *Van Tiegh. sensu stricto.* 441 *Theobroma cacao*, ubiquitous, common internal mould of prepared cacao. Bull. 16, Gold Coast Dept. Agr., 49 (1929). 501 *Cocos nucifera* (copra), ubiquitous. 547 *Butyrospermum parkii*, Tamale, in kernels.

(A number of forms of *A. niger sensu lato* occur on raw products, including probably *A. cinnamomeus* Schiem.)

—— **ochraceus** *Wilhelm.* 471 *Theobroma cacao*, ubiquitous, common internal mould of prepared cacao. Bull. 16, Gold Coast Dept. Agr., 52, 1929. 493 *Cocos nucifera*, ubiquitous, common mould on copra.

—— ——. 548 *Theobroma cacao*, Kpeve, internal mould of prepared cacao. P. Biourge, in litt., 1933, proposed to describe this isolation as a n. sp., but the present author considers it to be a variety of *A. ochraceus* characterized by a subglobose vesicle and by mass colour at maturity chamois (Ridgeway xxx 19″ b).

—— —— 568 *Theobroma cacao*, Kumasi, internal mould of prepared cacao. 592 *Cocos nucifera*, Keta, mould on copra. P. Biourge, in litt., 1933, proposed to describe this isolation as a n. sp., but the present author considers it to be a variety of *A. ochraceus* characterized by a bright red reverse.

—— **repens** (*Corda*) *Sacc.* 563a Imported cheese, Aburi.

—— **ruber** (*Spieck. et Brem.*) *Thom et Church.* 563b Imported cheese, Aburi; 567b/3 *Cocos nucifera* (Copra), Keta.

—— **sydowi** (*Bain. et Sart.*) *Thom et Church.* 550 *Theobroma cacao*, widespread, common mould of prepared cacao.

—— **tamarii** Kita. 35 *Theobroma cacao*, ubiquitous, common mould of prepared cacao. Bull. 16, Gold Coast Dept. Agr., 50 (1929). 499 *Cocos nucifera* (Copra). 83 *Elaeis guineensis* fruits. 547 *Butyrospermum parkii* kernels.

—— —— var. 579 *Theobroma cacao*, Kpeve, internal mould of prepared cacao. (An albino variety of *A. tamarii*.)

Aspergillus† wentii *Wehmer.* 549 *Theobroma cacao,* Kpeve, internal mould of prepared cacao.

***Asterina alchorneae** *Syd.* in Ann. Mycol., **36,** 168 (1938). 875 *Alchornea cordifolia,* Aburi, Apedwa.

*—— **connectilis** *Syd.* in Ann. Mycol., **37,** 227 (1939). 951 *Olax subscorpioidea,* Aburi.

—— **lawsoniae** *P. Henn. et Nym.* 203 *Lawsonia inermis,* Kibi, Aburi.

—— **strophanthi** *P. Henn.* B101 *Strophanthus hispidus,* Aburi.

—— **tertia** *Rac.* var. **africana** *Doidge.* 865 *Justicia flava,* Aburi.

Asterinella stuhlmannii (*P. Henn.*) *Theiss.* 1001 *Ananas comosus,* Aburi.

***Auerswaldia maxima** *Massee* in Kew Bull. 1901, 166. J58 dead branches, Aburi.

Bagnisiopsis dioscoreae *Wakefield.* 651 *Dioscorea smilacifolia,* Axim, " choke "-like stromata on stems. Petrak (Ann. Mycol. **32,** 429) made this the type of his genus *Phylleutypa.*

Calonectria (?) **aurantiella** *Penz. et Sacc.* J96 bis.

—— **diploa** (*Berk. et Curt.*) *Wollenw.* (In aet. conid.—*Pseudomicrocera henningsii* (Koorders) Petch var. *longispora* Petch). 142 *Aspidiotus* sp. on *Rosa,* Aburi. 237 Scale insect on *Codiaeum,* Kumasi.

Calosphaeria sp. 216 *Theobroma cacao* stumps and roots, Abomposu.

Capnodium sp. aff. **brasiliense.** B27 *Citrus aurantiifolia,* Tamale.

—— sp. B125 *Lagerstroemia flos-reginae,* Prestea.

Ceratostomella fimbriata (*Ell. et Halst.*) *Elliott.* 452 *Hevea brasiliensis,* Avrebu, " mouldy rot " of tapping cut.

*—— **paradoxa** *Dade* in Trans. Brit. Mycol. Soc., **13,** 184–194 (1928). (Synonyms: *Endoconidiophora paradoxa* (Dade) Davidson, *Ophiostoma paradoxum* (Dade) Melin et Nannfeldt.) 123 *Elaeis guineensis,* Anaje, stem rot. 354 *Cocos nucifera,* Kumasi, stem rot. 355 *Ananas comosus,* widespread, rot of overripe fruits. 449 *Theobroma cacao,* widespread, saprophyte on discarded husks. The heterothallic perfect stage of *Thielaviopsis paradoxa* (de Seynes) von Höhnel.

***Chaetomium arachnoides** *Massee et Salmon* in Ann. Bot., **16,** 71 (1902). J, on sheep's excreta, (?) Aburi. Chivers states that this is not a *Chaetomium.*

*Chaetomium globosum *Kunze.* 477 Soil, and contaminant in cultures, widespread. Bull. 16, Gold Coast Dept. Agr., 252 (1929).

Cordyceps spp. 277 Various Hymenoptera and Muscids, widespread.

Daldinia angolensis (*Welw. et Curr.*) *Sacc.* J92 (?)Aburi (as *Xylaria eriodendri*). H31, Ashanti.

—— **eschscholtzii** ([*Ehrenb.*]) *Rehm.* J16, 1005, on rotting logs, ubiquitous. Very common saprophyte, and native purgative.

Dexteria pulchella *Stev.* 926a *Paullinia pinnata,* Aburi.

Diatrype caminata *Kalchbr. et Cooke.* J76, decorticated branch, Aburi.

Elsinoe fawcetti *Bitanc. et Jenk.* 663 *Citrus limonia,* Asuansi, scab.

*Endodothella deightonii *Syd.* in Ann. Mycol., **36,** 162 (1938). 889 *Albizzia gummifera,* Dodowa, Aburi.

Epichloe cinerea *Berk. et Br.* 258 *Sporobolus pyramidalis,* Aburi, " choke." Bull. 10, Gold Coast Dept. Agr., 47 (1928).

Erysiphe—see **Oidium.**

Eudarluca australis *Speg.*, the perfect stage of *Darluca filum,* q.v. 140, parasitizing *Puccinia rufipes* on *Imperata cylindrica* var. *thunbergii,* Aburi; 165 parasitizing *Puccinia maydis* on *Zea mays,* Kumasi; 374 parasitizing *Puccinia rottboeliae* in *Rottboelia exaltata,* Odumase; 380 parasitizing rust on *Paspalum conjugatum,* Dunkwa; 416 parasitizing *Puccinia purpurea* on *Sorghum vulgare,* Ejura. Bull. 10, Gold Coast Dept. Agr., 31, 44 (1928).

Eurotium—see **Aspergillus,** above.

Eutypa erumpens *Massee.* B73 *Hevea brasiliensis,* Tarkwa.

*Eutypella theobromicola *Wakefield* in Kew Bull. 1918, 209. B4 *Theobroma cacao* stems, Koshea.

Gibberella fujikuroi (*Saw.*) *Wollenw.* 382 *Zea mays,* Asuansi, stalk and ear rot; only the conidial forms are known at present in the Gold Coast. Gold Coast Dept. Agr. Bull. 7, 25 (1927), [as *Oospora* sp.]; Bull. 10, 26 (1920), [as *G. moniliformis* (Sheld.) Winel.]

—— —— var. **subglutinans** *Edwards.* 626 *Musa cavendishii,* Magwil (Takoradi), on bulb and roots secondary to nematode attack.

Glomerella cingulata (*Stonem.*) *Spauld. et von Schrenk* (see also *Colletotrichum, Gloeosporium*). 81 *Theobroma cacao*, throughout rain forest, in the acervular form *Colletotrichum coffeanum* Noack, as a weak parasite and saprophyte on overripe and cast-off immature pods. Bull. 6, Gold Coast Dept. Agr. (1927). 432 *Elaeis guineensis* fruits, Odumase. 552 *Manihot utilissima*, widespread, anthracnose (as perfect form of *Gloeosporium manihotis* P. Henn.). 440 *Coffea*, Dunkwa, leaf spot. 638 *Musa cavendishii*, Aburi, on dead flowers.

—— **gossypii** *Edgert.* Cotton bolls, Togoland, anthracnose.

Hypocrella reineckiana *P. Henn.* 263 *Lecanium viride* on *Citrus*, Aburi. 974 (?)*Stictococcus* sp. on *Antiaris africana*, Aburi.

Hypomyces ipomoeae (*Halst.*) *Wollenw.* parasitizing *Armillaria mellea*. 29 on *Theobroma cacao*, Akrofofo and Kibi, 634 on *Manihot utilissima*, Kumasi.

Hypoxylon annulatum (*Schw.*) *Mont.* J81 dead bark, Aburi.

—— **rubiginosum** (*Pers. ex Fr.*) *Fr.* J180.

—— **sclerophaeum** *Berk. et Curt.* (Syn. *Pyrenopolyporus hunteri* Lloyd in Lloyd's Myc. Notes, **5**, p. 706, 1917.) H333 dead roots of *Hevea brasiliensis*, Kumasi.

Irenina combreti *Stev.* 886 *Combretum* sp., Aburi, Apedwa.

—— **cyclopoda** (*Stev.*) *Stev.* 903 *Melanthera brownei*, Aburi, Apedwa.

—— **entebbeensis** *Hansf. et Stev.* 755 *Manihot utilissima*, Kokorantumi.

—— **tremae** (*Speg.*) *Stev.* 976 *Trema guineensis*, Akwadum.

—— sp. on *Trichilia heudelotii*, Aburi.

Irenopsis aciculosa (*Wint.*) *Stev.* 906 *Hibiscus esculentus*, Akwadum. 741 *Sida carpinifolia*, Tafo. 863 *Sida urens*, Aburi.

—— **chandleri** *Hansf.* 1006 on *Costus afer*, Kokorantumi.

—— **coronata** (*Speg.*) *Stev.* var. **hibisci** *Hansf.* 805 *Hibiscus owariensis*, Obosomase.

—— —— var. **vanderystii** (*Beeli*) *Stev.* 763 *Triumfetta rhomboidea*, Kwau, Anyinam.

—— **molleriana** (*Wint.*) *Stev.* 762 *Urena lobata*, Anyinam.

—— **tenuissima** (*Stev.*) *Stev.* 845 *Gouania longipetala*, Suhum-Apedwa.

Kretschmaria cetrarioides (*Welw. et Curr.*) *Sacc.* H, dead roots of *Hevea brasiliensis*, Kumasi.

—— **clavus** (*Fr.*) *Fr.* J104.

—— **micropus** (*Fr.*) *Sacc.* 40 *Hevea brasiliensis*, widespread. (Also on rotting logs.)

Leptosphaeria sacchari *Breda de Haan.* 141 *Saccharum officinarum*, widespread, "ring spot." Bull. 10, Gold Coast Dept. Agr., 17, 41 (1928).

Megalonectria pseudotrichia (*Schw.*) *Speg.* B3 *Theobroma cacao*, Assuansi. B1 *Cola acuminata*, Aburi. 410 *Rosa*, Sekondi, canker.

Melanospora zamiae *Corda.* 680 *Musa sapientum*, Aburi, saprophyte on leaves; associated with *Chlamydomyces palmarum*.

Meliola alstoniae *Koord.* 893 *Alstonia congensis*, Aburi.

—— **cardiospermi** *Hansf. et Stev.* 914 *Cardiospermum grandiflorum*, Huhunya, Aburi.

—— **carissae** *Doidge.* 884 *Carissa grandiflora*, Aburi.

—— **clerodendri** *Hansf.* 758 *Clerodendron bucholzii*, Nankese, Aburi.

—— **clerodendricola** *P. Henn.* 860 *Clerodendron capitatum*, Aburi.

—— **dracaenicola** *Pat. et Har.* 822 *Dracaena smithii*, Aburi.

—— **elaeis** *Stev.* 819 *Elaeis guineensis*, Aburi.

—— **geniculata** *Syd. et Butl.* 895 *Lannea acidissima*, Aburi.

—— **incompta** *H. et P. Syd.* 959 *Hilleria latifolia*, Aburi.

—— **jasminicola** *P. Henn.* 833 *Jasminum sambac*, Aburi.

—— **landolphiae** *Hansf.* 964 *Apocynaceae* indet., Suhum.

—— **malacotricha** *Speg.* 1024 *Merremia dissecta*, Aburi.

—— **microspora** *Pat. et Gaill.* 742 *Ocimum viride*, Tafo. 734 *Sesamum radiatum*, Kwau.

—— **panici** *Earle.* 731 *Vetiveria zizanoides*, Aburi. 957 grass indet., Aburi.

—— **paulliniae** *Stev.* 835 *Paullinia pinnata*, Nsawam, Aburi.

—— **perpusilla** *Syd.* var. **congoensis** *Beeli.* 1010 *Secamone myrtifolia*, Apedwa.

Meliola piperina *H. et P. Syd.* 956 *Piper umbellatum*, Aburi.

—— **plumbaginis** *Hansf. et Stev.* J168, 336 *Plumbago zeylanica*, Aburi.

—— **simillima** *Ellis et Everh.* 754 *Rauwolfia vomitoria*, Kokorantumi, Aburi. 804 *Holarrhena* (?) *wulfsbergii*, Obosomase.

—— **sinuosa** *Doidge.* 943 *Trichilia heudelotii*, Aburi.

—— **substenospora** *von Höhnel.* 945 *Setaria chevalieri*, Aburi.

—— **tamarindi** *Syd.* 958 *Tamarindus indica*, Aburi.

—— **thomasii** *Hansf.* 928 *Placodiscus pseudostipularis*, Aburi. *Phialodiscus unijugatus*, Aburi. 930 *Sapindaceae* indet., Aburi.

—— **trifurcata** *Ciferri.* 924 *Carapa procera*, Aburi.

Microthyrium sp. 54 *Elaeis guineensis*, Seysi.

Mycosphaerella gossypina (*Atk.*) *Earle.* 423 *Gossypium*, Kumasi, leaf spot.

Myriangium duriaei *Mont. et Berk.* B104 parasitizing *Mytilapsis citricola* on *Citrus sinensis*, Kumasi.

Nectria fuliginosa *Berk. et Br.* J137 leguminous pods, Okroase.

—— **haematococca** *Berk. et Br.* 385 *Citrus aurantiifolia* bark, Asuansi.

—— **jungneri** *P. Henn.* J144 on bark, Aburi (as *N. theobromae*). 79 *Theobroma cacao* pods, Amedzofe.

*—— **massei** *Sacc. et D. Sacc.* J74 dead bark, Aburi (as *N. verrucosa* Massee in Kew Bull., 1901, 166).

—— **vilis** (*Syd.*) *Petch* (in aet. conid. *Tubercularia coccicola* Stev.). 257 parasitizing *Mytilaspis citricola* on *Citrus aurantiifolia* twigs, Koforidua.

—— sp. B72 *Hevea brasiliensis* roots, Kumasi.

Nummularis pithodes (*Berk. et Br.*) *Petch.* 127 *Eugenia uniflora*, Juaso, as a saprophyte.

—— spp. B100 dead wood, Aburi. 409 *Theobroma cacao* stems, Kumasi.

Ophiobolus heterostrophus *Drechsl.* (in aet. conid. *Helminthosporium maydis* Nisik. & Miy.). 132 *Zea mays*, widespread, leaf and tassel mould and " black auricle " disease. Bull. 10, Gold Coast Dept. Agr., 14–16, 19, 20 (1928) (incorrectly identified as *H.* sp. aff. *sativum* Pamm., King & Bakke).

Oplothecium sp. 304 *Cocos nucifera* leaves, Aburi.

Penicillium digitatum *Sacc.* 573 *Citrus paradisi*, widespread, following punctures by fruit moths, and causing fruit fall.

—— **rugulosum** *Thom.* 573a *Citrus paradisi*, in association with and probably parasitizing *P. digitatum*.

—— (a number of other *P. species*, not definitely identified, but of economic interest, have been recorded, including 544 *Theobroma cacao*, Kpeve, mould in prepared cacao, also on copra, a new ascigerous species; 602 a related strain appearing as a contamination in cultures, Aburi; 473 *Theobroma cacao*, widespread, mould in prepared cacao; 496 *Cocos nucifera*, Keta, mould on copra; 563 Cheese, Aburi; 634 X-ray film, Accra, destructive mould on the emulsion.)

Phaeodimeriella sp. 944 parasitizing *Irenina* on *Trichilia heudelotii*, Aburi.

Phyllachora assimilis *Theiss. et Syd.* 1020 *Cymbopogon giganteus*, Accra plains.

—— **digitariae** *Syd.* 748 *Digitaria velutina*, Mamfe.

—— **heterospora** *P. Henn.* 86 *Panicum maximum*, Aburi. Bull. 10, Gold Coast Dept. Agr., 45 (1928). (A collection recorded as *P. graminis* (Pers.) Fckl., J184 "*Arundo*," is probably identical.)

—— **lactea** *Theiss. et Syd.* 867 *Dalbergia saxatilis*, Aburi.

*—— **neurophila** *Syd.* in Ann. mycol., **37**, 219 (1939). 781 *Ficus exasperata*, Akwadum.

—— **sphaerosperma** *Wint.* 747 *Paspalum scrobiculatum*, Mamfe.

—— sp. 365 *Pennisetum purpureum*, Kumasi.

Podonectria coccicola (*Ell. et Ev.*) *Petch.* 263 Scale insect on *Citrus*, Aburi.

—— sp. (in aet. conid. *Tetracium*.) 93 *Lepidosaphes pinnaeformis* on *Citrus limonia*, Aburi. 257 *Mytilaspis citricola* on *Citrus aurantiifolia*, Koforidua.

Rosellinia (?) **arcuata** *Petch.* B46 *Theobroma cacao* roots, Aburi.

*—— **asperata** *Massee apud Wakef.* in Kew Bull. 1918, 209. J178 rotten wood, Aburi.

—— sp. 503 *Theobroma cacao* roots, Anyinam.

Schizothyrium melanoplacum (*Mont.*) *Sacc.* J54 *Justicia flava* leaves, Aburi.

Sordaria sp. 604 *Ipomoea rubro-caerulea* flowers, Aburi.

Sphaerostilbe cinnabarina *Tul.* J41 dead bark, Aburi.

—— **coccophila** *Tul.* B43 *Mytilaspis citricola* on *Citrus*, Aburi.

—— **repens** *Berk. et Br.* B23 *Hevea brasiliensis*, Kumasi. 383 *Citrus aurantiifolia*, Asuansi. Bull. 7, Gold Coast Dept. Agr., 23 (1927).

Thamnomyces chamissonis *Ehrenb. ex Fr.* J24, H, dead wood, Aburi, Ashanti. B132 dead wood of *Ficus elastica*, Aburi; C. G. Lloyd, " Synopsis of some genera of the large Pyrenomycetes," 11–12 (1917).

***Thielavia setosa** *Dade* in Trans. Brit. Mycol. Soc., **21**, 16 (1937). 555 *Theobroma cacao*, Kpeve, in prepared cacao. A large-spored species, dependent for its full development on the presence of other fungi, notably *Aspergillus*, or their extracts.

Ustilaginoidea sp. (aff. *ochracea* P. Henn.) 288 *Setaria chevalieri*, Begoro, Abomposu. Bull. 10, Gold Coast Dept. Agr., 47 (1928). Apparently a new species.

Ustulina zonata (*Lév.*) *Sacc.* H267 *Ficus* and *Hevea brasiliensis*, Ashanti. 6 *Theobroma cacao*, widespread, collar rot associated with bark borer attack and poor condition of host.

Xylaria allantoidea *Berk.* H260, Ashanti.

—— **anisopleura** *Mont.* H260, Ashanti.

[—— **eriodendri** *P. Henn.* see *Daldinia angolensis.*]

—— **gomphus** *Fr.* H193, Ashanti.

—— **grammica** *Mont.* H137, H265, Ashanti.

—— **haemorrhoidalis** *Berk. et Br.* H266, Ashanti.

—— **hypoxylon** (*Linn. ex Fr.*) *Grev.* H86, Ashanti.

—— **involuta** *Klotz.* var. **nigrescens** *Sacc.* H262, Ashanti.

—— **laevis** *Lloyd.* H250, Ashanti.

*—— **moriformis** *Lloyd* in " Xylaria Notes," 30 (1918).

—— **nigripes** (*Klotz.*) *Sacc.* 275 as a termite-garden fungus, fruiting on abandoned nests, Aburi.

—— **plebeja** *Ces.* H30, Ashanti.

—— **polymorpha** (*Pers. ex Fr.*) *Grev.* H69, Ashanti.

—— —— var. **pistillaris** *Nits.* H249, Ashanti.

—— **protea** *Fr.* H97, Ashanti.

—— **rhopaloides** (*Kunze*) *Mont.* J33, Aburi.

Xylaria schweinitzii *Berk. et Curt.* H173, Ashanti. (sec. Lloyd= var. of *X. polymorpha*).

—— **scopiformis** *Mont.* J48 dead wood, Aburi.

—— **scruposa** (*Fr.*) *Berk. sensu Theiss.* H174, Ashanti.

—— **tabacina** (*Kickx*) *Berk.* J18 dead wood, Aburi.

—— **torquescens** *Sacc.* H, Ashanti.

—— **variabilis** *Welw. et Curr.* H137, Ashanti (sec. Lloyd= immature *X. grammica*, q.v.)

—— sp. 63 ant garden fungus, Aburi.

Zukalia sp. B68 *Coffea stenophylla*, Aburi.

Discomycetes.

***Bulgaria turbinata** *Massee* in Kew Bull., 1901, 166. J70 decaying wood, Aburi.

Cookeina sulcipes (*Berk.*) *Kuntze.* J47 dead branches, Aburi; 1009 fallen branch, Apedwa.

***Hysterium vermiforme** *Massee* in Kew Bull., 1901, 166. J69 dead branches, Aburi.

—— sp. 74A *Strophanthus hispidus*, Aburi, leaf spot.

Mollisia sp. 428 dead wood of *Theobroma cacao*, Adeiso.

[**Trichoscypha hindsii** (*Berk.*) *Sacc.* See *Cookeina sulcipes.*]

***Tryblidiella tetraspora** *Massee* in Kew Bull., 1906, 257. J119 dead branches, Aburi.

Basidiomycetes

Hemibasidiomycetes

Aecidium bomolense *Syd.* 715 *Adenia cissampeloides*, Mape.

—— **cassiae** *Bresad.* 713 *Cassia tora*, Kwau, Nankese.

*—— **codiaei** *Syd.* in Ann. Mycol., **37,** 198 (1939). 813 *Codiaeum variegatum*, Mangoase.

—— **incomparabile** *Syd.* 1057 *Canthium.*

*—— **micrococcae** *Syd.* in Ann. Mycol., **36,** 159 (1938). 738 *Micrococca mercurialis*, Aburi.

—— **phyllanthi** *P. Henn.* 859 *Phyllanthus discoideus*, Aburi.

—— **tubulosum** *Pat. et Gaill.* forma **africanum** *P. Henn.* 210 *Solanum melongena*, Asuansi.

*Cerotelium corchori *Syd.* in Ann. Mycol., **36,** 158 (1938). 912 *Corchorus olitorius*, Koforidua.

—— **desmium** (*Berk. et Br.*) *Arthur.* 15 *Gossypium*, Accra.

—— **proximellum** *Syd.* 952 *Lannea acidissima*, Aburi.

Cintractia axicola (*Berk.*) *Cornu.* 993 *Fimbristylis dichotoma*, Kokorantumi.

—— **limitata** *Clint.* 221 *Mariscus umbellatus*, Aburi.

—— **peribebuyensis** *Speg.* J189.

Graphiola phoenicis (*Moug.*) *Poit.* 539 *Phoenix* sp., Accra.

*Hemileia buntingii *Wakefield et Hansf.* n. sp. *Sori uredosporiferi* hypophylli, in pustulas parvas per totam folii superficiem dens dispositi, pulverulenti, flavidi. *Uredosporae* primo subglobosae, laeves, demum plus minusve tetraedricae angulis obtusis, episporio sursum aculeis conicis laxe obsitis, saepe usque 2·5μ incrassato, basin versus laeve, tenuiter tunicato (1μ) 22–37μ longae, 20–25μ altae, 20–28μ latae, hyalinae vel dilute flavidae. *Sori teleutosporiferi* intermixti, albidi. *Teleutosporae* ovatae vel ellipsoideae, laeves, rarius ad apicem 3–4 aculeis minutis instructae, hyalinae, episporio 1–2μ crasso, 22–32 × 17–22μ.

Hab. in foliis *Strophanthi hispidi* DC., Aburi, Gold Coast Colony, September 29th 1922, *R. Bunting* (type) ; also collected Entebbe, Uganda, *Small* 650.

The uredospores are arranged as shown by Sydow in Monogr. Ured. 3, 196, tab. 8, with the warted side uppermost and the longest axis horizontal. The species differs from *H. strophanthi* Rac. in smaller uredospores, which are not so pronouncedly aculeate and are usually thinner-walled. Some spores show rather larger aculei (up to 3μ long) towards the distal end, where the wall may be thickened up to 2·5μ. The teleutospores are quite different in shape.

—— **deightonii** *Syd.* 868 *Rauwolfia vomitoria*, Aburi.

—— **dioscoreae-aculeatae** *Syd.* 298 *Dioscorea bulbifera*, Kumasi.

—— **scholzii** *Syd.* 843 *Clerodendron bucholzii*, Suhum-Apedwa.

Puccinia batatae *Syd.* 938 *Ipomoea digitata*, Accra.

—— **digitariae** *Pole Evans.* 1000 *Digitaria velutina*, Aburi.

—— **erythraeensis** *Pazschke.* 170 *Andropogon gabonensis*, Tamale. Bull. 10, Gold Coast Dept. Agr., 43, 47 (1928). 854 *Cymbopogon giganteus*, Accra plains.

—— **heterospora** *Berk. et Curt.* 259 *Sida rhombifolia*, Accra. 864 *Sida urens*, Aburi.

Puccinia hoslundiae *Syd.* 915 *Hoslundia opposita*, Tafo.

—— **lantanae** *Farl.* 803 *Lantana camara*, Obosomase, Achimota.

—— **lateritia** *Berk. et Curt.* 941 *Borreria ramisparsa*, Aburi.

—— **maydis** *Béreng.* 165 *Zea mays*, widespread. Bull. 10, Gold Coast Dept. Agr., 18–19 (1928).

—— **penniseti** *Zimm.* 189 *Pennisetum typhoides*, Aburi. Bull. 10, Gold Coast Dept. Agr., 36 (1928).

*—— **physedrae** *Syd.* in Ann. Mycol., **36,** 156 (1938). 831 *Physedra barteri*, Aburi.

—— **purpurea** *Cooke.* 416 *Sorghum vulgare*, Ejura. Bull. 10, Gold Coast Dept. Agr., 30–31, 43 (1928). (Uredo stage only.)

—— **romagnoliana** *Maire et Sacc.* 749 *Cyperus distans*, Suhien. 1064 *Cyperus esculentus*. Mankessim. 710 *Cyperus sphacelatus*, Esiama.

—— **rottboeliae** *Syd.* 169 *Rottboelia exaltata*, Ejura, Odumase, Koforidua. Bull. 10, Gold Coast Dept. Agr., 46 (1928).

—— **rufipes** *Diet.* 140 *Imperata cylindrica* var. *thunbergii*, Aburi, Ejura. Bull. 10, Gold Coast Dept. Agr., 44 (1928).

—— **setariae** *Diet. et Holw.* J88.

—— **versicolor** *Diet. et Holw.* 855 *Heteropogon contortus*, Accra plains.

—— sp. 295 *Urochloa insculpta*, Kumasi. Bull. 10, Gold Coast Dept. Agr., 43, 47 (1928).

Ravenelia ornata *Syd.* 828 *Abrus precatorius*, Aburi.

*—— **zygiae** *Syd.* in Ann. Mycol., **36,** 157 (1938). 885 *Albizzia zygia*, Suhum-Apedwa, Aburi.

Sorosporium sp. 249 *Vetiveria fulvibarbis*, Accra.

Sphacelotheca sorghi (*Link*) *Clint.* 159 *Sorghum vulgare*, Ejura, and widespread in savanna. Bull. 10, Gold Coast Dept. Agr., 29, 30 (1928).

Tolyposporium penicillariae *Bref.* 191 *Pennisetum typhoides*, Tamale. Bull. 10, Gold Coast Dept. Agr., 33 (1928).

Uredo kyllingae *P. Henn.* 861 *Kyllinga* sp., Aburi.

—— **longaensis** *P. Henn.* 908 *Combretum* sp., Akwadum.

—— **philippinensis** *Syd.* 438a *Cyperus distans*, Aburi.

—— **scabies** *Cooke.* 800 *Vanilla planifolia*, Aburi.

Uromyces appendiculatus (*Pers.*) *Link.* 714 *Phaseolus vulgaris*, Aburi. 999 *Dolichos lablab*, Aburi.

—— **commelinae** *Cooke.* 146 *Commelina* sp., Aburi.

—— **eragrostidis** *Tracy.* 750 *Eragrostis ciliaris*, Mamfe.

—— **leptodermus** *Syd.* 774 *Brachiaria distichophylla*, Aburi.

—— **melantherae** *Cooke.* 770 *Melanthera brownei*, Adawso, Apedwa.

—— **mucunae** *Rabenh.* 1068 *Mucuna* sp., Ejura.

—— **tenuicutis** *McAlp.* 751 *Sporobolus pyramidalis*, Mamfe.

Ustilago heterospora *P. Henn.* 218 *Panicum maximum*, widespread. Bull. 10, Gold Coast Dept. Agr., 44 (1928).

—— **zeae** (*Beckm.*) *Ung.* 107 *Zea mays*, ubiquitous. Bull. 10, Gold Coast Dept. Agr., 6 (1928). (Introduced in 1924.)

Eubasidiomycetes

Amauroderma auriscalpium (*Pers.*) *Lloyd.* H314, Ashanti.

—— **conjunctum** *Lloyd.* H129, Ashanti.

—— **exile** (*Berk.*) *Lloyd.* J86 (?) Akuapem. H151, Ashanti.

—— **rude** (*Berk.*) *Lloyd.* H151, Ashanti.

—— **rugosissimum** *Lloyd.* H312, Ashanti.

—— **salebrosum** *Lloyd.* H182, Ashanti: Lloyd's Mycol. Notes, 5, 807 (1916–19).

Armillaria mellea (*Vahl ex Fr.*) *Quél.* 12 *Theobroma cacao*, throughout rain forest, " collar crack " (a destructive disease in some localities). Bull. 5, Gold Coast Dept. Agr. (1927). 100 *Ceiba pentandra*, Amedzofe. 253 *Xanthosoma sagittifolium*, Logba Tota. 634 *Manihot utilissima*, Kumasi. (The following additional hosts are recorded, without precise locality, in a survey by F. N. Howes: *Alchornea cordifolia, Blighia sapida, Capsicum annuum, Chlorophora excelsa, Citrus aurantiifolia, Cocos nucifera, Coffea* sp., *Colocasia antiquorum, Combretum* sp., *Elaeis guineensis, Ficus asperifolia, Funtumia africana, Hibiscus esculentus, Mangifera indica, Musa paradisiaca, Pennisetum purpurea, Persea americana, Phyllanthus discoideus, Pittosporum* sp., *Rauwolfia vomitoria, Spathodea campanulata, Terminalia* sp.)

Auricularia auricula-judae (*Linn. ex Fr.*) *Schroet.* H, dead bark, ubiquitous.

—— **delicata** (*Fr.*) *P. Henn.* H23, Ashanti.

Auricularia Hunterii *Lloyd.* H, Ashanti. Lloyd's Mycol. Notes, 5, 808 (1918).

——**polytricha** (*Mont.*) *Pat.* J84, (?) Aburi.

Calvatia cyathiformis (*Bosc*) *Morg.* H, Ashanti.

Clitocybe maxima (*Fr.*) *Quél.* J111, (?) Aburi.

Collybia sp. 23a/5, Aburi (edible mushroom).

Corticium, see **Rhizoctonia.**

Cyathus intermedius (*Mont.*) *Tul.* J85, (?) Aburi.

—— **limbatus** *Tul.* B135 Bamboo, Aburi.

*__Cyphella lilacina__ *Massee* in Kew Bull., 1901, 164. J57 dead herbaceous stems, Aburi.

Daedalea dregeana *Mont.* H, Ashanti.

Dictyophora indusiata (*Vent. ex Pers.*) *Fischer.* J115, (?) Aburi. 289, Anyinam, Aburi.

Favolus tesselatus *Mont.* J39 dead wood, Aburi.

Flammula sapinea (*Fr.*) *Quél.* J4 decayed wood, Aburi.

Fomes caliginosus (*Berk.*) *Cooke.* H239, Ashanti.

—— **caryophylli** (*Racib.*) *Bres.* H92, Ashanti.

—— **hornodermus** (*Mont.*) *Cooke.* H37, Ashanti.

—— **lignosus** (*Klotz.*) *Bres.* H34, Ashanti. 45 *Theobroma cacao,* common throughout forest zone, " white root " rot. 649 *Dioscorea* sp., Ejura. Also occurring commonly on *Citrus, Coffea, Hevea brasiliensis,* and many other wild and cultivated hosts.

—— **malvenus** *Lloyd.* H62, Ashanti.

—— **melanoporus** (*Mont.*) *Cooke.* H158, Ashanti.

—— **noxius** *Corner.* B76 *Hevea brasiliensis,* common in forest zone ; 43 *Theobroma cacao,* throughout forest zone ; " brown root " rot. 494 *Theobroma cacao,* Moseaso, on trunk and branches. Bull. 16, Gold Coast Dept. Agr., 253 (1929). 591 *Duranta repens,* Aburi. (Also common on *Citrus, Coffea,* and many other hosts, as a root parasite.)

—— **oroflavus** *Wilson.* H38, Ashanti.

—— **pectinatus** (*Klotz.*) *Gill.* H93, Ashanti.

—— **pseudosenex** (*Murr.*) *Sacc. et Trott.* H, Ashanti.

Fomes semitostus *Auct.* H, Ashanti.

—— **senex** (*Nees et Mont.*) *Cooke.* H25, Ashanti.

—— **spadiceus** (*Berk.*) *Cooke.* H61, Ashanti.

Ganoderma applanatum ([*Pers.*]) *Pat.* H39, Ashanti.

—— **australe** (*Fr.*) *Pat.* J181, Aburi. H237, Ashanti.

—— **colossus** (*Fr.*) *Bres.*

—— **curtisii** (*Berk.*) *Murr.* H34, Ashanti.

—— **fulvellum** *Bres.* H20, Ashanti.

—— **lucidum** (*Leys. ex Fr.*) *Karst.* J19 dead wood, Aburi. 128 *Elaeis guineensis*, widespread in forest zone, collar rot. 366 *Manihot utilissima*, Ejura, tuber rot : Bull. 7, Gold Coast Dept. Agr., 24 (1927). Also common as a saprophyte on decaying timber, and typically stipitate, though often sessile on palm trunks.

—— **mangiferae** (*Lév.*) *Pat.* H20, Ashanti.

Geaster velutinum *Morgan.* H, Ashanti.

Gloeoporus conchoides *Mont.* H46, Ashanti.

Hexagonia hirta (*Palis.*) *Fr.* H23, Ashanti.

—— **niamniamensis** *P. Henn.* H18, Ashanti.

—— **speciosa** *Fr.* H13, 25, Ashanti. H75, Ashanti (as *H. crassipora* Lloyd).

—— **tenuis** (*Hooker*) *Fr.* H19, Ashanti.

—— **umbrinella** *Fr.* J5 dead twigs of *Hevea brasiliensis*, Ashanti.

—— **wightii** (*Klotz*) *Fr.* J100.

Hirneola, see **Auricularia.**

***Hydnum lateritium** *Massee* in Kew Bull., 1906, 256 ; 1907, 124. J107 in humus, Aburi.

—— sp. 630 *Citrus aurantiifolia* twigs, Achimota, as a saprophyte.

Irpex flavus *Klotz.* H6, 29, Ashanti.

***Kalchbrennera clathrata** (*Lloyd*) *Lloyd.* 25a, soil, Aburi : Lloyd's Mycol. Notes, 1230 (1923).

Lachnocladium cartilagineum *Berk. et Curt.* J38 dead wood, Aburi.

Lachnocladium furcellatum (*Fr.*) *Lév.* J171, (?) Aburi.

Lactarius ligniotus *Fr.*

Lentinus blepharodes *Berk. et Curt.* J15, Aburi. H, Ashanti.

—— **tuber-regium** *Fr.* H178, Ashanti. 85a *Araucaria* logs, Aburi.

—— **velutinus** *Fr.* H199, Ashanti.

—— **villosus** *Klotz.* H201, Ashanti.

Lenzites palisoti *Fr.* J49 dead wood, Aburi. H1, Ashanti. 1016, Akwadum.

Lepiota (?) **carcharias** ([*Pers.*]) *Karst.* 25a/3, Aburi.

*—— **johnsonii** *Massee* in Kew Bull., 1901, 161. J2, Aburi.

—— (?) **procera** (*Scop. ex Fr.*) *Quél.* 23a/4, Aburi. Edible.

Marasmius (?) **aleurites** *Berk. et Cooke.* J96, (?) Aburi.

*—— **byssicola** *Petch* in Trans. Brit. Mycol. Soc., **13,** 143 (1928). 214 *Theobroma cacao* foliage, and 47 *Cola acuminata* foliage, Kumasi, Abomposu, " purple thread " blight.

——(?) **concolor** *Berk. et Curt.* J97, (?) Aburi.

—— **equicrinis** *Müll.* B67 *Theobroma cacao,* throughout forest zone. 57 *Cereus* sp., Aburi, " horsehair blight."

—— (?) **merulinus** *Berk. et Curt.* J, (?) Aburi.

*——**scandens** Massee in Kew Bull., 1910, 1. B130 *Theobroma cacao* and *Cola acuminata* foliage, throughout forest zone. " White thread " leaf blight.

—— **spaniophyllus** (*Berk.*) *Sacc.* J35 dead branch, Aburi.

—— **stenophyllus** *Mont.* 612 *Musa sapientum* and *M. paradisiaca,* Aburi, Asuansi. Stem rot.

—— sp. 265 *Zea mays,* Bunso, leaf blotch. Bull. 10, Gold Coast Dept. Agr., 22 (1928).

—— spp. 273 *Hevea brasiliensis* bark, Abontiakoon. B10 in mulch, Aburi.

Panus conchatus (*Bull. ex Fr.*) *Fr.* J14 dead wood, Aburi.

—— **torulosus** (*Pers. ex Fr.*) *Fr.* J21 buried wood, Aburi.

***Pistillaria johnsonii** *Massee* in Kew Bull., 1901, 165. J82 on dead herbaceous stems, Aburi.

***Pleurotus colae** *Massee* in Kew Bull., 1912, 357. B2 and 15a, *Cola acuminata* fruits, Aburi.

Polyporus arcularius (*Batsch ex Fr.*) *Fr.* H200, Ashanti.

—— **capensis** *Lloyd.* H.45, Ashanti.

—— **cupuliformis** *Berk. et Curt.* J94, (?) Aburi.

—— **dialeptus** *Fr.* H, Ashanti.

—— **durus** *Jungh.* H78, Ashanti.

—— **gilvus** (*Schwein.*) *Fr.* H50, Ashanti.

—— **hemicapnodes** *Berk. et Br.* J23 dead wood, Akuapem. (Described by Massee in Kew Bull., 1901, 163, as *Polystictus nigripes* sp. nov.)

—— **hollandii** *Massee.* (?) J, (?) Aburi. Kew Bull. 1901, 163.

—— **intactilis** *Lloyd.* H187, Ashanti.

—— **japonicus Fr.** H240, Ashanti.

—— **mollerianus** *Berl. et Roum.* H52, Ashanti.

—— **mollitextus** *Lloyd* in Lloyd's Mycol. Notes, **6,** 880.

—— **oerstedii** *Fr.* H, Ashanti.

—— **ostreiformis** *Berk.* H14, Ashanti.

—— **velutinosus** Lloyd. H120, Ashanti.

Polystictus caperatus (*Berk.*) *Fr.* H22, Ashanti.

—— **chrysites** (*Berk.*) *Cooke.* J45 dead wood, Aburi.

—— **cinerescens** (*Lév.*) *Cooke.* H3, Ashanti.

—— **didrichsenii** *Fr.* H16, Ashanti.

—— **funalis** (*Fr.*) *Fr.* J, (?) Aburi.

—— **fusco-zonatus** *Lloyd* in Lloyd's Mycol. Notes **5,** Letter 69, p. 12 (1919). H115, Ashanti.

—— **gallopavonis** (*Berk. et Br.*) *Cooke.* H15, Ashanti.

—— **hirsutus** (*Fr.*) *Fr.* J179, (?) Aburi.

—— **leoninus** (*Klotz.*) *Fr.* H67, Ashanti.

—— **licnoides** (*Mont.*) *Fr.* H108, Ashanti.

—— **luteo-nitidus** (*Berk.*) *Cooke.* H237, Ashanti.

—— **luteo-olivaceus** (*Berk. et Br.*) *Cooke.*

—— **malaiensis** *Cooke.* H72, Ashanti.

—— **membranaceus** (*Swartz*) *Fr.* J12 dead wood, Aburi.

—— **menziesii** (*Berk.*) *Fr.* H111, Ashanti.

Polystictus meyenii (*Klotz*) *Cooke.* H7, H11, Ashanti.

[*——**nigripes** *Massee*, see *Polyporus hemicapnodes*.]

—— **occidentalis** (*Klotz*) *Fr.* J10 dead wood, Aburi. H4, Ashanti.

[—— **rigens** *Sacc. et Cub.*, see *Trametes rigida* Berk. et Mont.]

—— **sanguineus** (*Linn. ex Fr.*) *Fr.* J26 dead log, Aburi. H21, Ashanti. 1017, Akwadum.

—— **tabacinus** (*Mont.*) *Fr.* J11 dead wood, Aburi.

—— **torridur** *Fr.* H106, Ashanti.

—— **versatilis** (*Berk.*) *Fr.* H58, Ashanti.

—— **versicolor** (*Linn. ex Fr.*) *Fr.* J43 dead branches, Aburi.

—— **vinosus** (*Berk.*) *Cooke.*

—— **xanthopus** (*Fr.*) *Fr.* J27 branches, Aburi.

Poria hypobrunnea *Petch.* 346 *Theobroma cacao* roots, Nsawam. (Record based on mycelium and clinical symptoms.)

—— **hypolateritia** *Berk. ex Cooke.* 388 *Citrus aurantiifolia* roots, Asuansi. (Record based on mycelium and clinical symptoms.)

—— **vaporaria** (*Fr.*) *Cooke.* J117, (?) Aburi.

Psalliota sp. (aff. **villatica** or **elvensis**). 23a/5, Aburi.

Psilocybe atrorufa (*Schaeff.*) *Quél.* J114, Aburi.

*—— **citrina** *Massee* in Kew Bull., 1901, 162.

***Ptychogaster africanus** *Lloyd* in Lloyd's Mycol. Notes, **6,** 886 (1919). H, Ashanti.

Schizophyllum commune *Fr.* J175 dead wood, Aburi. 629 *Tamarindus indica*, Achimota. Common and ubiquitous on dead branches and rotting timber.

Stereum affine *Lév.* H242 dead wood, Ashanti.

—— **bolleanum** *Mont.* H35, Ashanti.

—— **durum** *Lloyd.* H247, Ashanti.

—— **hirsutum** (*Willd. ex Fr.*) *Fr.* J34 dead wood, Aburi.

—— **involutum** *Klotz.* H213, Ashanti.

—— **nitidulum** *Berk.* H77, Ashanti.

—— **ostrea** (*Blume et Nees*) *Fr.* H237, Ashanti.

Trametes cingulata *Berk.* H10, Ashanti.

Trametes corrugata (Pers.) *Bres.* J29 dead wood, Aburi. H11, H309, Ashanti.

—— **devexa** *Berk.* H143, Ashanti.

—— **heteropora** (*Mont.*) *Bres.* H70, Ashanti.

—— **hystrix** *Cooke.* H154, Ashanti.

—— **rigida** *Berk. et Mont.* J17 dead wood, Aburi.

—— **roseola** *Pat. et Har.* H17, Ashanti.

—— **versiformis** *Berk. et Br.* H9, Ashanti.

Tremella fuciformis *Berk.* J7 rotten wood, Aburi.

***Trogia hispida** *Massee* in Kew Bull., 1901, 162. J50 dead twigs, Akim.

Volvaria volvacea (*Bull. ex Fr.*) *Quél.* 23a/1, ubiquitous in forest zone. Edible, cultivated by natives on heaps of peelings from *Xanthosoma sagittifolium* corms or *Manihot utilissima* tubers, also on *Elaeis guineensis* trunks felled for palm-wine manufacture.

FUNGI IMPERFECTI

Coelomycetes

Aschersonia crenulata *Pat. et Har.* 13a on insects on *Funtumia elastica*, Aburi.

*——**flavescens** *Petch* in Trans. Brit. Mycol. Soc., **23**, 137 (1939). 966 on insects on *Raphia*, Nankese.

—— **oxystoma** *Berk.*

Ascochyta heveae *Petch.* 341 *Hevea brasiliensis*, Wiawso, " rim blight " of leaves.

Botryodiplodia theobromae *Pat.* (Syn. **Diplodia arecae* Mass., **D. rapax* Mass.) J143 *Manihot utilissima* stems, Aburi. 1 *Theobroma cacao*, throughout forest zone on over-ripe or damaged pods (pod rot) and dying twigs, never as a strong parasite : Bull. 6, Gold Coast Dept. Agr. (1927). Also very common and ubiquitous as a storage fungus, weak wound or secondary parasite, and saprophyte, on *Butyrospermum parkii* kernels, *Citrullus vulgaris* fruits, *Citrus* fruits, *Cocos nucifera* leaves, *Coffea* leaves, *Cola acuminata* " nuts," *Dioscorea* tubers, *Elaeis guineensis* fruits, *Hevea brasiliensis* rubber, *Ipomoea batatas* tubers, *Luffa cylindrica* fruits, *Manihot utilissima* tubers, *Pandanus*, *Passiflora quadrangularis* fruits, and *Zea mays* grain : Bull. 10, Gold Coast Dept. Agr., 27 (1928).

Ceuthospora sp. 247 Indet. herb, Kumasi.

Colletotrichum capsici (*Syd.*) *Butl. et Bisby.* 613 *Xanthosoma sagittifolium*, Tutu, on leaves of plants debilitated by root rot.

[—— **coffeanum** *Noack*, see *Glomerella cingulata*.]

*—— **echinatum** *Massee* in Kew Bull., 1906, 257. J131, on bark, Aburi.

—— **gloeosporioides** (*Penz.*) *Sacc.* J158 *Furcraea gigantea*, Aburi.

—— **graminicola** (*Ces.*) *Wils.* 183 *Sorghum vulgare*, Ejura, leaf spot. Bull. 10, Gold Coast Dept. Agr., 31 (1928).

—— **nigrum** *Ellis et Halst.* B118 *Capsicum annuum*, Aburi.

—— see also **Gloeosporium.**

Darluca filum (*Biv.*) *Cast.* (See *Eudarluca australis*).

Diplodia agaves. *Niessl.* 207 *Agave sisalana*, Aburi, leaf spot.

[*—— **arecae** *Massee* in Kew Bull., 1912, 358=*Botryodiplodia theobromae*, q.v. E2 *Areca catechu*, Aburi.]

—— **macrospora** *Earle.* 154 *Zea mays*, ubiquitous, "leaf stripe": Bull. 10, Gold Coast Dept. Agr., 21, 26 (1928).

[*——**rapax** *Massee* in Kew Bull., 1910, 3=*Botryodiplodia theobromae*, q.v. E1 *Hevea brasiliensis* branches, Aburi.]

Discella cacaoicola *App. et Strunk.* 81 *Theobroma cacao* pods, Aburi.

[**Gloeosporium manihotis** *P. Henn.*=*Glomerella cingulata*, q.v.]

—— **musarum** *Cooke et Massee.* 538 *Musa sapientum* fruits, in transit to England, stalk-end rot.

—— sp. 621 *Carica papaya* fruit, Accra.

***Haplosporella violaceae** *Massee* in Kew Bull., 1901, 165. J36 dead bark, (?) Aburi.

Hendersonia sp. 316 dead bark, Kumasi.

Macrophoma sp. aff. **scaphidiospora** *Sousa da Camara.* 294 *Theobroma cacao* pods, Kumasi.

—— spp. 55 *Elaeis guineensis* leaves, Aburi. 605 *Hibiscus rosa-sinensis* corolla, Aburi.

Melasmia sp. 194 *Ficus vogelii* leaves, Ejura, "tar spot."

Oothecium consimile *Syd.* 977 *Trema guineensis*, Akwadum.

Pestalozzia (?) **coffeae** *Zimm.* B48 *Coffea liberica* leaves, Aburi.

Pestalozzia palmarum *Cooke.* 92 *Cocos nucifera* leaves, widespread.

—— **versicolor** *Speg.* 310 *Xanthosoma sagittifolium* leaves, Tutu.

—— spp. 616 *Aleurites montana*, Aburi. 96 *Chrysobalanus icaco*, Aburi. 304 *Cocos nucifera*, Aburi. 131 *Coffea*, Aburi. 636 *Hevea brasilensis*, Aburi. 147 *Mimusops* (?) *elengi*, Aburi. 74a *Strophanthus hispidus*, Aburi. 617 *Voandzeia subterranea*, Tamale. 232 *Zea mays*, Aburi.

Phoma zeicola *Ell. et Ev.* 232 *Zea mays* leaves, widespread: Bull. 10, Gold Coast Dept. Agr., 23, 26 (1928).

—— sp. 230 *Dioscorea* leaves, Kumasi.

Phyllosticta colocasiae *von Höhnel.* 527 *Xanthosoma sagittifolium*, Aburi.

—— spp. 291 *Coffea*, Essiama. 14 *Dioscorea*, Kumasi. 209 *Ficus*, Christiansborg. 618 *Panax*, Aburi. 617 *Voandzeia subterranea*, Tamale. *Zea mays*, Atebubu.

Pyrenochaeta sp. 693 *Dolichos lablab*, Aburi.

Hyphomycetes and Mycelia Sterilia

[**Acrothecium lunatum** *Wakker*, see *Curvularia lunata.*]

Alternaria macrospora *Zimm.* 426 *Gossypium*, Sampa, Seikwa.

Arthrobotrys superba *Corda* var. **oligospora** (*Fresen.*) *Coemans.* 551b Contaminant in culture, Aburi.

Aspergillus—see under Euascomycetes.

Beauveria bassiana (*Bals.*) *Vuill.* 5 *Belanogaster colae* (Kola weevil), ubiquitous; 105a *Coelaenomenodera elaeidis* (oil-palm leaf-miner beetle), Aburi; 105a grasshopper, Aburi; 453 Zygaenid cocoons, Atwabo.

Brachysporium sp. 460 *Sorghum vulgare*, Achimota.

Cephaliophora tropica *Thaxt.* 585 *Theobroma cacao*, Kpeve, Aburi, on prepared cacao.

Cephalosporium acremonium *Corda.* 225 *Zea mays*, ubiquitous, " black bundle " disease of stalks, and leaf spot. Gold Coast Dept. Agr. Bull. 7, p. 25 (1927); 10, pp. 9, 10, 26 (1928). 117 parasitizing *Phytophthora palmivora* (*Mimusops* strain only), Aburi. 336 parasitizing *Meliola* on *Plumbago zeylanica*, Aburi.

Cercospora canavaliae *Syd.* 794 *Canavalia ensiformis*, Aburi.

—— **carbonacea** *Miles.* 992 *Dioscorea cayennensis*, Kokorantumi.

Cercospora caribaea *Cif.* 682 *Manihot utilissima*, ubiquitous, white leaf spot.

—— **carotae** (*Pass.*) *Solh.* 802 *Daucus carota*, Aburi.

—— (?) **chrysobalani** *Ell. et Ev.* 77 *Chrysobalanus icaco*, Aburi.

—— **coffeicola** *Berk. et Cooke.* B122 *Coffea seedlings*, Juaso.

—— **contraria** *Syd.* 730 *Dioscorea triphylla*, Ntano.

—— (?) **desmodii** *Ellis et Kellerm.* 797 *Desmodium triflorum*, Dodowa.

—— **fusimaculans** *Atk.* 973 *Panicum maximum*, Aburi.

—— **henningsii** *Allesch.* 95 *Manihot utilissima*; 76 *Manihot glaziovii*; ubiquitous, brown leaf spot or blotch.

—— **hibisci** *Tracy et Earle.* 850 *Hibiscus esculentus*, Accra, Koforidua.

*—— **latimaculans** *Wakefield* in Kew Bull., 1918, 210. B93 *Bauhinia thonningii*, Aburi.

—— **nicotianae** *Ell. et Ev.* 36 *Nicotiana tabacum*, ubiquitous.

—— **personata** (*Berk. et Curt.*) *Ell. et Ev.* B114, and 332, *Arachis hypogaea*, ubiquitous.

—— **phyllanthi** *Chupp.* 968 *Phyllanthus amarus*, Aburi.

—— **physalidicola** *Speg.* 815 *Physalis angulata*, Mangoase.

—— **ricinella** *Sacc. et Berl.* 793 *Ricinus communis*, Aburi.

—— **sesami** *A. Zimm.* 734 *Sesamum radiatum*, Kwau.

—— **sorghi** *Ell. et Ev.* 135 *Andropogon halepense*; 268 *Sorghum vulgare*; ubiquitous. Bull. 10, Gold Coast Dept. Agr., 32, 44 (1928).

—— **volkameriae** *Speg.* 1002 *Clerodendron scandens*, Aburi.

—— spp. 82 *Anona muricata.* 184 *Andropogon gayanus.* 375 *Sorghum arundinacearum.*

Cerebella cenchroidis *Subram.* 160 *Pennisetum polystachyon*; 459 *Pennisetum typhoides*; 462 *Panicum maximum*; widespread. Bull. 10, Gold Coast Dept. Agr., 46 (1928).

Chlamydomyces palmarum (*Cooke*) *Mason.* 680 *Musa sapientum* leaves, Aburi.

Chloridium musae *Stahel.* 266 *Musa sapientum*, ubiquitous, common leaf speckle.

Ciliciopodium macrosporum *Penz. et Sacc.* 798 *Crotalaria retusa*, Aburi.

Cladosporium fulvum *Cooke.* B128 *Lycopersicum esculentum*, leaf mould.

—— **herbarum** (*Pers.*) *Link ex Fr.* 362 *Zea mays* ; 495 *Cocos nucifera* (copra) ; 160 *Pennisetum polystachyon* ; widespread, leaf mould. Bull. 10, Gold Coast Dept. Agr., 23, 24, 35 (1928).

—— spp. 608 *Hibiscus rosa-sinensis*, Accra. 160 *Pennisetum polystachyon*, widespread, associated with *Cerebella cenchroidis* in smutted heads.

Clasterosporium maydicum *Sacc.* 226 *Zea mays* leaves, Ejura, Aburi. Bull. 10, Gold Coast Dept. Agr., 24 (1928).

Cordana musae (*Zimm.*) *von Höhnel.* 94 *Musa sapientum*, Aburi ; 1012 *Musa schweinfurthii*, Aburi ; leaf blotch.

Curvularia geniculata (*Tracy et Earle*) *Boedijn.*
——**lunata** (*Wakker*) *Boedijn.* } 155 *Zea mays* ; 290 *Oryza sativa* ; 394 *Saccharum officinarum* ; 396 *Sorghum vulgare* ; ubiquitous ; leaf spots, flower mould, and (on maize) " black auricle " disease. Bull. 16, Gold Coast Dept. Agr., 16 (1929) (as *Acrothecium lunatum* Wakker).

***Dendryphium effusum** *Massee* in Kew Bull., 1901, 167. J71 dead branches, (?) Aburi.

Discofusarium (?) **tasmaniense** (*McAlp.*) *Petch.* 41a on a spider, Aburi.

Epicoccum neglectum *Desmaz.* 364 *Zea mays*, Ejura : Gold Coast Dept. Agr. Bull. 7, 27 (1929) ; 10, 25 (1928).

Fusarium heterosporum *Nees* (forma) J42 *Pennisetum typhoides*, Krobo. 219 *Panicum maximum*, Aburi, mould of inflorescences. Bull. 10, Gold Coast Dept. Agr., 45 (1928).

—— **oxysporum** *Schl.* var. **cubense** (*E. F. Sm.*) *Wollenw.* 942 *Musa sapientum*, Nkwanta nr. Takoradi. Only once recorded.

—— **semitectum** *Berk. et Rav.* 626 *Musa cavendishii*, Magwil (Takoradi), secondary on leaves after nematode attack.

—— —— var. **majus** *Wollenw.* 74 *Bougainvillaea glabra* and *B. spectabilis*, widespread, destroying flower buds in very humid localities.

—— **solani** (*Mart.*) *App. et Wollenw.* 310 *Xanthosoma sagittifolium*, ubiquitous, saprophyte after root rot.

Fusarium spp. 616 *Aleurites montana*, Aburi, 343 *Canna indica*, Aburi, leaf rot. 387 *Citrus aurantiifolia*, Asuansi, on dead bark. 489 *Cocos nucifera*, Aburi, copra mould. 526 *Ixia* sp., Aburi, leaf blotch. 427 *Gossypium*, Kintampo, wilt. 634 *Manihot utilissima*, Kumasi, wilt and collar rot. *Pennisetum typhoides*, widespread, head mould. 460 *Sorghum durra*, Achimota, head mould. 562 *Theobroma cacao*, Kpeve. 112 *Zea mays*, Aburi, damping off.

Gibellula pulchra (*Sacc.*) *Cav.* 90b, on spiders, Aburi.

***Graphium anomalum** *Massee* in Kew Bull., 1908, 218. J112, on stem, Aburi.

—— **stercorarium** *March.* J, on monkey's excreta, (?) Aburi : Ann. Bot. **16**, 88 (1902).

Helminthosporium cassiaecola *Berk. et Curt.* 73 *Afzelia africana*, Aburi, leaf spot.

*—— **coffeae** *Massee* in Kew Bull., 1901, 167. J8 *Coffea*, Aburi. B44 and 87, on various Meliolineae on *Coffea*, Aburi. 334 on *Meliola* sp. on *Butyrospermum parkii*, Aburi.

—— **heveae** *Petch.* B103 *Hevea brasiliensis*, Prestea, Kibi, leaf spot.

[—— **maydis** *Nisik. et Miy.*, see *Ophiobolus heterostrophus*.]

—— **oryzae** *Breda de Haan.* 171 *Oryza sativa*, widespread, brown leaf spot and inflorescence mould. Bull. 10, Gold Coast Dept. Agr., 17, 38–40 (1928).

—— **ravenelii** *Curt.* 222 *Sporobolus pyramidalis*, widespread, black inflorescence mould. Bull. 10, Gold Coast Dept. Agr., 47 (1928).

—— (?) **rostratum** *Drechsl.* 225 *Zea mays*, Aburi, Odumase, associated with "black auricle" disease. Gold Coast Dept. Agr. Bull. 7, 27 (1927) ; Bull. 10, 20 (1928).

—— **turcicum** *Pass.* 134 *Zea mays* ; 135 *Andropogon halepensis* ; ubiquitous ; leaf blight. *Bull.* 10, Gold Coast Dept. Agr., 12, 14, 21, 44 (1928).

—— spp. 238 *Andropogon* sp., Ejura, on leaves. 105 *Dioscorea* sp., Aburi, on leaves. 27 *Hibiscus rosa-sinensis*, Aburi, on leaves. 228 *Pennisetum typhoides*, Aburi, on leaves and flowers. 359 *Rottboelia exaltata*, Juaso, on leaves. 394 *Saccharum officinarum*, Asuansi, long leaf spot. 460 *Sorghum durra*, Achimota, on flowers. 447 *Theobroma cacao*, Aburi, on pods. 524 *Vetiveria zizanoides*, Aburi, on leaves.

Heterosporium spp. 126 *Dioscorea*, Juaso, on leaves. 235 *Theobroma cacao*, Aburi, on twigs.

Hirsutella citriformis *Speare*. 90a parasitizing *Coelaenomenodera elaedis* (leaf miner beetle) on *Elaeis guineensis*, Aburi.

Hormodendrum sp. 557 contaminant in culture, Aburi, common.

***Isaria aburii** *Lloyd* in Lloyd's Mycol. Notes, **7,** 1180, 1923. B134 on a spider, Aburi. See Petch, Trans. Brit. Mycol. Soc. **18,** 72. Lloyd wrote the specific name "*abutii*" in error.

*—— **acervata** *Massee* in Kew Bull., 1901, 167. J59 on dead wood, Aburi.

*—— **buntingii** *Lloyd* in Lloyd's Mycol. Notes, **5,** 615 (1916). On cocoons.

Microcera sp. On *Mytilaspis citricola* on *Citrus*.

Monilia sitophila (*Mont.*) *Sacc.* 98 *Zea mays*, ubiquitous, on discarded cobs; also common on palm trunks, logs, etc., after bush has been burned in clearings.

Mucrosporium sp. 519 on moss, Aburi.

Myrothecium roridum *Tode ex Fr.* 881a *Dolichos lablab*, Aburi.

Nigrospora oryzae (*Berk. et Br.*) *Petch.* 103 *Oryza sativa*, Adebrem, leaf spot. Bull. 10, Gold Coast Dept. Agr., 40 (1928); Trans. Brit. Mycol. Soc., **12,** 160 (1928).

—— **sacchari** (*Speg.*) *Mason.* 561 *Theobroma cacao*, Kumasi, mould on prepared cacao.

—— **sphaerica** (*Sacc.*) *Mason.* 231 *Zea mays*, Aburi. 439 *Saccharum officinarum*, Aburi. 380 *Paspalum conjugatum*, Dunkwa. 1030 *Citrus paradisiaca*, without precise locality. 1046 *Piper nigrum*, without precise locality. Bull. 10, Gold Coast Dept. Agr., 24, 40, 42 (1928); Trans. Brit. Mycol. Soc., **12,** 158, 160 (1928).

Oidium spp. 766 *Acalypha ciliata*, Akwadum. 533 *Cocos nucifera*, Aburi, in fermenting palm-wine. 85 *Cucumis melo*, Aburi. B47 *Cucurbita pepo*, widespread. 858 *Euphorbia hirta*, Aburi. 913 *Hibiscus esculentus*, Koforidua. 772 *Phyllanthus niruri*, Aburi. 840 *Pouzolzia guineensis*, Suhum-Apwead, 787 *Spigellia anthelmia*, Achimota.

Oospora citri-aurantii (*Ferr.*) *Sacc. et Syd.* 580 *Citrus paradisiaca*, Aburi, causing fruit rot following puncture by citrus moth.

—— **gigas** *Smit et Myers.* 533 *Cocos nucifera*, Aburi, in fermenting palm-wine.

Papularia sphaerosperma (*Pers. ex Fr.*) *von Hohnel.* 226 *Zea mays*, Aburi, on leaves: Bull. 10, Gold Coast Dept. Agr., 25 (1928).

Penicillium—see under Ascomycetes.

Periconia (?) **pycnospora** *Fresen.* 74a *Strophanthus hispidus* leaves, Aburi; 312 *Manihot utilissima* leaves, Asamangkese: a common saprophyte, secondary on leaf spots, etc., on numerous hosts throughout the Gold Coast.

Piricularia oryzae *Cav.* 32 *Oryza sativa*, widespread: "blast." Bull. 10, Gold Coast Dept. Agr., 37–8 (1928).

Podosporium sp. 333, 338, parasitizing *Meliola* on *Coffea*, Aburi.

Pseudocamptoum fasciculatum (*Cooke et Massee*) *Mason.* 293 *Elaeis guineensis*, Aburi & Anaje, on leaves. 795 *Theobroma cacao*, Effiduase, Akwadum, on leaves.

[*Pseudomicrosera henningsii*—see *Calonectria diploa.*]

[*Ragnhildiana manihotis* Stev. et Solh.=*Cercospora caribaea*, q.v.]

Rhizoctonia melongena *Mats.* *Xanthosoma sagittifolium*, without precise locality.

—— **solani** *Kuhn.* 808 *Acalypha tricolor*, Aburi. 775 *Basella rubra*, Aburi. B120 *Canavalia ensiformis*, Aburi. 223 *Clerodendron fallax*, Sekondi. 572 *Colocasia antiquorum*, widespread, in association with root rot. 26 *Dahlia*, Aburi, root rot and "muck blight." 149 *Daucus carota*, Aburi, "muck blight." 975 *Impatiens balsamina*, Aburi. 632 *Panax* sp., Aburi, root rot. 26 *Phaseolus coccineus* and *P. vulgaris*, Aburi, root rot and "muck blight." 644 *Pilea* sp., Aburi, foot rot. 817 *Salvia coccinea*, Aburi. 319 *Theobroma cacao*, Dunkwa. 662 *Vicia faba*, Aburi, root rot and "muck blight." 310 *Xanthosoma sagittifolium*, widespread, in association with root rot. 615 *Zea mays*, Anyinam. (In "muck blight" stems and foliage are thickly covered with mycelium and sclerotia.)

Sclerotium rolfsii *Sacc.* 371 *Alternanthera* sp., Aburi. 34 *Arachis hypogaea*, Kpedsu. 41 *Bauhinia alba*, Kumasi. 102 *Cassia siamea*, collar rot of saplings. 90 *Coreopsis* sp., Aburi. 30 *Glycine max*, Kibi, wilt. 512 *Helianthus tuberosus*, Aburi. 645 *Lobelia*, Aburi, foot rot. 276 *Melinis minutiflora*, Aburi. 124 *Passiflora quadrangularis*, Aburi. 518 *Phaseolus coccineus* and *P. vulgaris*, Aburi. 487 *Pistia stratiotes*, Aburi: Bull. 16, Gold Coast Dept. Agr., 252 (1929). 71 *Scilla* sp., Aburi. 311 *Xanthosoma sagittifolium*, Wenkye. (Very commonly responsible for damping-off and foot rot of numerous hosts in conditions of excessive humidity, etc.)

Scopulariopsis brevicaulis (*Sacc.*) *Bain.* 486 in cacao fermentation boxes, Aburi : Bull. 16, Gold Coast Dept. Agr., 252 (1929). 569 *Theobroma cacao,* Kpeve, on prepared cacao.

—— sp. 581 contaminant in culture, Aburi.

Spegazzinia meliolae *Zimm.* B68 parasitizing *Meliola* on *Coffea stenophylla,* Aburi. 943 parasitizing *Meliola* on *Trichilia heudelotii,* Aburi. 944 parasitizing *Irenina* on *Trichilia heudelotii,* Aburi.

—— **ornata** *Sacc.* 551a contaminant in culture, Aburi.

Sphacelia sp. 125 *Andropogon gayanus* var. *bisquamulatus,* Kumasi, Ejura. 192 *Pennisetum typhoides,* Achimota, Tamale ; apparently identical with " asali " disease in Tanganyika, but is not *S. Sorghi* : Bull. 10, Gold Coast Dept. Agr., 34, 43, (1928).

Stachybotrys sp. 676 *Eriobotrya japonica,* Accra, on leaves of imported plants.

Stachylidium theobromae *Turconi.* 339 *Musa cavendishii,* Aburi, finger-tip rot, or cigar-end rot.

***Stilbum albipes** *Massee* in Kew Bull., 1901, 167. J65 on bark, Aburi.

—— spp. 61 *Tephrosia vogelii* twigs, Aburi ; 634 *Manihot utilissima* twigs, Kumasi ; and on dead bark and twigs of numerous plants, as saprophytes.

[**Thielaviopsis paradoxa** (de Seynes) von Höhnel.—see *Ceratostomella paradoxa.*]

Torula sacchari *Corda.* 567f *Cocos nucifera,* Keta, mould on copra.

Trichoderma viride *Pers. ex Fr.* 578 on bindings of book, Aburi. 254 on a caterpillar, Aburi.

Trichothecium roseum *Link ex Fr.* 551b contamination in culture, Aburi ; also as a saprophyte on dead plant tissues.

***Zygosporium echinosporum** *Bunting et Mason* (to be published). 563f on imported cheese, Aburi.

—— **oscheoides** *Mont.* 97 *Hevea brasiliensis,* Aburi, leaf spot.

MYXOMYCETES

Diachaea leucopoda (*Bull.*) *Rost.* J103.

Didymium melanospermum (*Pers.*) *Macbr.* (*D. farinaceum* Schrad.). J151.

Fuligo sp. on *Elaeis guineensis* shells, Seysi.

Lycogala epidendrum (*Linn.*) *Fr.* J95.

Stemonitis fusca *Roth.* J135, B108, Juaso.

BACTERIA

Bacillus megaterium *de Bary.* 533 *Theobroma cacao*, Aburi, in the fermentation mass.

—— **undulatus** *van Dooren de Jong.* 533 *Theobroma cacao*, Aburi, in the fermentation mass.

Bacterium malvacearum (*E. F. Smith*) *E. F. Smith.* On *Gossypium*, Accra and Togoland, angular leaf spot and blackarm.

(?)——**tumefaciens** *Smith et Towns.* 42 *Theobroma cacao*, Abomposu, causing teratoid hyperplasia on branches and trunks.

(?) **Erwinia carotovora** (*L. R. Jones*) *Holland.* 148 *Daucus carota* and *Brassica rapa*, Aburi, rot of tap roots following insect damage. 646 *Brassica oleracea, B. rapa*, and *Lactuca sativa*, Aburi, collar rot.

—— sp. aff. **aroidea** (*Towns.*) *Holland.* 182 *Theobroma cacao*, Bekwai and Abomposu, stripe disease of pods.

Pseudomonas radicicola (*Beij.*) *Moore.* 20 *Glycine max*, and other leguminosae, ubiquitous, nodule bacteria.

Bacteria indet.: 188 *Cola acuminata*, Kumasi, pod rot. 206 *Gossypium*, Kpedsu, boll rot following insect attack. 516 *Sorghum vulgare*, Kpeve, stem blight. 240 *Zea mays*, Ejura, stem rot and wilt.

VIRUS DISEASES

685 *Arachis hypogaea*, ground-nut rosette, widespread.

690 *Gossypium*, cotton leaf curl, widespread.

534 *Lilium roseum*, Aburi, lily rosette or yellow flat.

507 *Manihot utilissima*, cassava mosaic, widespread.

642 *Nicotiana tabacum*, tobacco leaf curl, widespread. Also on the following wild hosts: *Acanthospermum hispidum*, Nsawam; *Malvastrum tricuspidatum*, Aburi; *Sida carpinifolia*, Saltpond.

658 *Saccharum officinarum*, Kumasi, sugar-cane mosaic.

660 *Zea mays*, Kumasi, leaf streak of maize.

Other virus diseases of as yet undetermined etiology, some of economic importance, include:

740 *Boerhaavia diffusa*, Anyinam, mosaic.

744 *Dioscorea cayenneensis*, Kokorantumi, mosaic.

692 *Gossypium*, Tamale, " red leaf droop."

430c *Hibiscus owariensis*, yellow mosaic: J. Agr. Res., **39**, 571 (1929).

430b *Kedrostis foetidissima*, Winnebah plains, yellow mosaic: J. Agr. Res., **39**, 571 (1929).

691 *Lycopersicum esculentum*, Kpeve, Aburi, leaf curl (tomato mosaic?).

631 *Manihot utilissima*, Aburi, bunchy top.

430a *Momordica charantia*, Aburi, yellow mosaic: J. Agr. Res., **39**, 571 (1929).

745 *Momordica foetida*, Suhum, yellow mosaic.

759 *Phaseolus lunatus*, Anyinam, yellow mosaic.

179 *Sesamum orientale*, Ejura, mosaic.

657 *Vigna unguiculata*, Kumasi, yellow mosaic.

ALGAE

Cephaleuros mycoidea *Karst.* 369 *Anacardium occidentale*, Ejura. B102 *Butyrospermum parkii*, Aburi. 611 *Camellia sinensis*, Aburi. B99 *Cola acuminata*, Aburi. 541 *Mangifera indica*, Achimota. B58 *Oreodoxa oleracea*, Aburi. 143 *Rosa*, Aburi. 540 *Strychnos nux-vomica*, Achimota. 104 *Theobroma cacao*, Asamangkese. (Common and ubiquitous, causing " red rust " on leaves and shoots of numerous hosts.

ANGIOSPERM PARASITES

Loranthus bangwensis *Engl. et Krause*
—— **farmari** *Sprague.*
—— **incanus** *Schumm. et Thon.*

666 Semi-parasites on numerous hosts, and important on *Theobroma cacao*. Locally known as " mistletoe."

Cassytha filiformis *Linn.* 668 *Anacardium occidentale* and bush trees and shrubs, widespread.

Cuscuta chinensis *Lav.* 669 *Acalypha*, *Anacardium occidentale*, *Codiaeum*, etc., ubiquitous, " Dodder."

Striga (?) **senegalensis** *Benth.* On *Sorghum vulgare*, Tamale and elsewhere in Northern Territories.

Thonningia sanguinea *Vahl.* 674 on forest tree roots, common and ubiquitous.

Viscum zenkeri *Engl.* 667 on numerous trees, common and widespread throughout forest zone.

NEMATODES

Anguillulina similis (*Cobb*) *Goodey*. 626 *Musa cavendishii*, Magwil (Takoradi), wilt.

Nematoda indet. : 30 *Glycine max*, Aburi and Kibi ; 430 Grass, indet., Tarkwa ; 678 *Lactuca sativa*, Aburi ; 525 *Lycopersicum esculentum*, Achimota ; 652 *Nicotiana tabacum*, Aburi ; *Petroselinum sativum*, Aburi ; root galls and stunting.

CAPSID INJURIES SIMULATING DISEASE

Helopeltis bergrothi *Reut.* 687 *Theobroma cacao*, pod spots.

—— **labaumei** *Popp.* 688 *Gossypium*, cankers and leaf spots. 689 *Camellia sinensis*, leaf spots.

—— sp. 686 *Acalypha tricolor*, leaf spots.

Sahlbergella theobroma *Dist.* 623 *Citrus* twigs, canker. 687 *Theobroma cacao* branches and twigs, canker.

—— **singularis** *Hagl.* 687 *Theobroma cacao*, pod spots.

Part II.

HOST INDEX

Phanerogams.

Abrus precatorius *L.*
Ravenelia ornata

Acalypha ciliata *Forsk.*
Oidium sp.

——**tricolor** *Seem.*
Cuscuta chinensis
Helopeltis
Rhizoctonia solani
Witches' broom, indet.

Acanthospermum hispidum *DC.*
Tobacco leaf curl virus

Adenia cissampeloides *Harms.*
Aecidium bomolense

Afzelia africana *Pers.*
Helminthosporium cassiaecola

Agave sisalana *Perr.*
Diplodia agaves
Rain scorch, non-parasitic

Albizzia gummifera *C. A. Smith*
Endodothella deightonii

——**zygia** *Macb.*
Ravenelia zygiae

Aichornea cordifolia *Muell. Arg.*
Armillaria mellea
Asterina alchorneae

Aleurites montana *E. H. Wils.*
Fusarium sp.
Pestalozzia sp.
Calcium and magnesium deficiency chlorosis

Allium ascalonicum *L.*
Aspergillus niger

Alstonia congensis *Engl.*
Meliola alstoniae

Alternanthera sp.
Sclerotium rolfsii

Anacardium occidentale *L.*
Cassytha filiformis
Cephaleuros mycoidea
Cuscuta chinensis

Ananas comosus (*L.*) *Merr.*
Asterinella stuhlmannii
Ceratostomella paradoxa

Andropogon gabonensis *Stapf*
Puccinia erythraeënsis

——**gayanus** *Kunth.* var. **bisquamulatus** *Hack.*
Cercospora sp.
Sphacelia sp.
Rust, indet.

Andropogon "halepensis *Brot."*
Cercospora sorghi
Helminthosporium turcicum

Anona muricata *L.*
Cercospora sp.

Antiaris africana *Engl.*
Angiotheca scabra

Apocynaceae
Meliola landolphiae

Arachis hypogaea *L.*
Cercospora personata
Sclerotium rolfsii
Rosette

Araucaria sp.
Lentinus tuber-regium

Areca catechu *L.*
Botryodiplodia theobromae

Artocarpus integer (*Thunb.*) *Merr.*
Rhizopus nigricans

"Arundo sp."
Phyllachora heterospora

Asparagus plumosus *Baker*
Mucrosporium sp.

Bambusa sp.
Cyathus limbatus

Basella rubra *L.*
Rhizoctonia solani

Bauhinia alba *Buch.-Ham. ex Wall.*
Sclerotium rolfsii

——**thonningii** *K. Schum.*
Cercospora latimaculans

Blighia sapida *Kon.*
Armillaria mellea

Boerhaavia diffusa *L.*
Choanephora cucurbitarum
Mosaic

Borassus flabellifer *L.* var. **aethiopicus** *Warb.*
False bud rot, secondary to Rhinoceros beetle

Borreria ramisparsa *DC.*
Puccinia lateritia

Bougainvillaea glabra *Choisy*
——**spectabilis** *Willd.*
Fusarium semitectum var. *majus*
Periconia (?) *pycnospora.*

Brachiaria distichophylla (*Trin.*) *Stapf.*
Uromyces leptodermus

Brassica oleracea *L.*
——**rapa** *L.*
(?) *Erwinia carotovora*

Butyrospermum parkii Kotschy
Aspergillus flavus
——*niger*
——*tamarii*
Botryodiplodia theobromae
Helminthosporium coffeae
Meliola sp.
Cephaleuros mycoidea

Camellia sinensis (*L.*) *Kuntze*
Cephaleuros mycoidea
Capsid "leaf spot"—*Helopeltis labaumei*

Canavalia ensiformis *DC.*
Cercospora canavaliae
Rhizoctonia solani

Canna indica *L.*
Fusarium sp.

Canthium sp.
Aecidium incomparabile

Capsicum annuum *L.*
Armillaria mellea
Colletotrichum nigrum
Non-parasitic "blossom-end rot"

Carapa procera *DC.*
Meliola trifurcata

Cardiospermum grandiflorum *Sw.*
Meliola cardiospermi

Carica papaya *L.*
Choanephora cucurbitarum
Gloeosporium sp.

Carissa grandiflora *A. DC.*
Meliola carissae

Cassia occidentalis *L.*
Pseudoperonospora sp.

——**siamea** *Lam.*
Sclerotium rolfsii

——**tora** *L.*
Aecidium cassiae

Ceiba pentandra *Gaertn.*
Armillaria mellea

Cereus sp.
Marasmius equicrinis

Chlorophora excelsa *Benth. et Hook.*
Armillaria mellea

Chrysobalanus icaco *L.*
Cercospora chrysobalani
Pestalozzia sp.

Citrullus vulgaris *Schrad.*
Botryodiplodia theobromae

Citrus aurantiifolia (*Christmann*) *Swingle*
Armillaria mellea
Botryodiplodia theobromae
Capnodium (?) *brasiliense*
Fusarium sp.
Hydnum sp.
Meliola (?) *penzigii*
Nectria haematococca
Poria hypolateritia
Sphaerostilbe repens
Chlorosis (Calcium and magnesium deficiency)
Gummosis

——**limonia** *Osbeck*
Botryodiplodia theobromae
Elsinoe fawcetti
Meliola (?) *penzigii*
Chlorosis (Calcium and magnesium deficiency)
Gummosis

——**paradisi** *Macf.*
Meliola (?) *penzigii*
Nigrospora sphaerica
Oospora citri-aurantii
Penicillium digitatum
——*rugulosum*
Trachysphaera fructigena
Chlorosis (calcium and magnesium deficiency)
Dry root rot
Gummosis
Sahlbergella theobroma " canker "

Clerodendron bucholzii *Gürke*
Hemileia scholtzii
Meliola clerodendri

——**capitatum** *Schum. et Thou.*
Meliola clerodendricola

——**fallax** *Lindl.*
Rhizoctonia solani

——**scandens** *Beauv.*
Cercospora volkameriae

Cocos nucifera *L.*
Absidia capillata (on copra)
Armillaria mellea
Aspergillus chevalieri (on copra)
——*flavus* (,, ,,)
——*niger* (,, ,,)
——*ochraceus* (,, ,,)
——*ruber* (,, ,,)
——*tamarii* (,, ,,)
Botryodiplodia theobromae
Ceratostomella paradoxa
Cladosporium sp. (on copra)
Fusarium sp. (,, ,,)
Mucor buntingii (,, ,,)
Oplothecium sp.

Cocos nucifera *L.*
Penicillium sp. (on copra)
Pestalozzia palmarum
Rhizopus nigricans (on copra)
Syncephalastrum cinereum (on copra)
Torula sacchari (on copra)
Fruit gummosis, physiological disorder
Leaf collapse, physiological disorder
Stem-bleeding, indet.

Codiaeum variegatum *Blume*
Aecidium codiaei

——sp.
Calonectria diploa (on scale insect)
Cuscuta chinensis

Coffea arabica *L.*
Helminthosporium coffeae (on Meliolineae)
Meliola sp.

——**liberica** *Bull. ex Hiern.*
Aspergillus niger
Capnodium (?) *brasiliense*
Meliola sp.
Pestalozzia sp.
Trachysphaera fructigena

——**stenophylla** *G. Don.*
Spegazzinia meliolae
Zukalia sp.
Witch broom, indet.

——(sp. not recorded)
Armillaria mellea
Botryodiplodia theobromae
Cercospora coffeicola
Colletotrichum coffeanum
Phyllosticta sp.
Podosporium sp.

Cola acuminata *Schott et Endl.* (including *C. nitida* Schott et Endl.)
Botryodiplodia theobromae
Marasmius scandens
——*byssicola*
Megalonectria pseudotrichia
Pleurotus colae
Cephaleuros mycoidea
Bacterial pod rot (indet.)

Colocasia antiquorum *Schott*
Armillaria mellea
Pythium sp.
Rhizoctonia solani
Root rot, indet.

Combretum sp.
Armillaria mellea
Irenina combreti
Uredo longaensis

Commelina sp.
Uromyces commelinae

Corchorus olitorius *L.*
Cerotelium corchori

Coreopsis sp.
Sclerotium rolfsii

Cosmos sulphureus *Cav.*
Rhizoctonia solani

Costus afer *Ker-Gawl.*
Irenopsis chandleri

Crotalaria retusa *L.*
Choanephora cucurbitarum
Cilicipodium macrosporum
Rhizopus nigricans

Cucumis melo *L.*
Oidium sp.

——**sativus** *L.*
Pseudoperonospora cubensis

Cucurbita pepo *L.*
Oidium sp.

Cymbopogon giganteus (*Hochst.*) *Chiov.*
Phyllachora assimilis
Puccinia erythraeënsis

Cyperus distans *L.*
Puccinia romagnoliana
Uredo philippinensis

——**esculentus** *L.*
Puccinia romagnoliana

——**sphacelatus** *Rottb.*
Puccinia romagnoliana

Cyphomandra betacea *Sendt.*
Phytophthora parasitica

Dahlia sp.
Rhizoctonia solani

Dalbergia saxatilis *Hook.*
Phyllachora lactea

Daucus carota *L.*
Cercospora carotae
Choanephora cucurbitarum
(?) *Erwinia carotovora*
Rhizoctonia solani

Desmodium triflorum *DC.*
Cercospora (?) *desmodii*

Digitaria velutina (*Forsk.*) *Beauv.*
Phyllachora digitariae
Puccinia digitariae

Dioscorea bulbifera *L.*
Hemileia dioscoreae-aculeatae

——**cayennensis** *Lam.*
Cercospora carbonacea
Mosaic (virus indet.)

Dioscorea dumetorum *Pax.*
Cercospora contraria

——**smilacifolia** *Wilden. et Th. Dur.*
Bagnisiopsis dioscoreae

——(spp. not recorded)
Botryodiplodia theobromae
Fomes lignosus
Helminthosporium sp.
Heterosporium sp.
Phoma sp.
Phyllosticta sp.

Dolichos lablab *L.*
Myrothecium roridum
Pyrenochaeta sp.
Uromyces appendiculatus

Dracaena smithii *Baker*
Meliola dracaenicola

Duranta repens *L.*
Fomes noxius

Elaeis guineensis *Jacq.*
Armillaria mellea
Aspergillus tamarii
Botryodiplodia theobromae
Ceratostomella paradoxa
Ganoderma lucidum
Glomerella cingulata
Macrophoma sp.
Meliola elaeis
Microthyrium sp.
Mycoderma sp.
Mycotoruloides sp.
Oidium sp.
Oospora gigas
} in palm-wine fermentation
Pseudocamptoum fasciculatum
Saccharomyces cerevisiae var. *ellipsoideus* (in palm-wine fermentation)
Wilt, physiological disorder

Eragrostis ciliaris (*L.*) *R. Br.*
(?) *Uromyces eragrostidis*

Eriobotrya japonica *Lindl.*
Stachybotrys sp.

Eugenia uniflora *L.*
Nummularia pithodes

Euphorbia hirta *L.*
Oidium sp.

Ficus asperifolia *Miq.*
Armillaria mellea

——**elastica** *Roxb.*
Thamnomyces chamissonis

Ficus exasperata *Vahl*
Phyllachora neurophila

——**platyphylla** *Del.*
Phyllosticta sp.

——**vogelii** *Miq.*
Melasmia sp.

Fimbristylis dichotoma Vahl
Cintractia axicola

Funtumia africana *Stapf*
Armillaria mellea

——**elastica** *Stapf*
Meliola sp.

Furcraea gigantea *Vent.*
Colletotrichum gloeosporioides

Glycine max (*L.*) *Merr.*
Pseudomonas radicicola
Nematodes, root galls

Gossypium sp.
Alternaria macrospora
Cerotelium desmium
Fusarium sp.
Glomerella gossypii
Mycosphaerella gossypina
Bacterial boll rot, indet.
Leaf curl virus.
" Red leaf droop " (virus, indet.)
Helopeltis labaumei " canker " and " leaf spot."

Gouania longipetala *Hemsl. in Oliver*
Irenopsis tenuissima

Helianthus tuberosus *L.*
Sclerotium rolfsii

Heteropogon contortus (*L.*) *Beauv.*
Puccinia versicolor

Hevea brasiliensis *Muell. Arg.*
Ascochyta heveae
Ceratostomella fimbriata
Eutypa erumpens
Fomes lignosus
——*noxius*
Helminthosporium heveae
Hexagonia umbrinella
Hypoxylon suborbiculare
Kretschmaria cetrarioides
——*micropus*
Marasmius sp.
Nectria sp.
Pestalozzia sp.
Phytophthora palmivora
Sphaerostilbe repens
Ustulina zonata
Zygosporium oscheoides
Bark nodules, non-parasitic

Hibiscus esculentus *L.*
Armillaria mellea
Cercospora hibisci
Irenopsis aciculosa
Oidium sp.

——**owariensis** *P. de Beauv.*
Irenopsis coronata var. *hibisci*
Yellow mosaic (virus, indet.)

——**rosa-sinensis** *L.*
Choanephora cucurbitarum
Cladosporium sp.
Helminthosporium sp.
Macrophoma sp.

Hilleria latifolia *H. Walter*
Meliola incompta

Holarrhena (?) **wulfbergii** *Stapf*
Meliola simillima

Hoslundia opposita *Vahl.*
Puccinia hoslundiae

Impatiens balsamina *L.*
Rhizoctonia solani

Imperata cylindrica (*L.*) *Beauv.* var. **thunbergii** (*Hack.*) *Durand et Schinz*
Puccinia rufipes
Eudarluca australis (on *P. rufipes*)

Ipomoea batatas (*L.*) *Lam.*
Botryodiplodia theobromae

——**digitata** *L.*
Puccinia batatae

——**rubro-caerulea** *Hook.*
Choanephora cucurbitarum
Sordaria sp.

Ixia sp.
Fusarium sp.

Jasminum sambac *Ait.*
Meliola jasminicola

Justicia flava *Vahl*
Asterina tertia var. *africana*
Schizothyrium melanoplacum

Kedrostis foetidissima *Cogn.*
Yellow mosaic (virus indet.)

Kyllinga sp.
Uredo kyllingae

Lactuca sativa *L.*
(?) *Erwinia carotovora*
Nematodes, root galls

Lagerstroemia flos-reginae *Rotz.*
Capnodium sp.

Lannea acidissima *A. Chev.*
Cerotelium proximellum
Meliola geniculata

Lantana camara *L.*
Puccinia lantanae

Lawsonia inermis *L.*
Asterina lawsoniae

Lilium roseum *Wall.*
Rosette (virus)

Lobelia sp.
Sclerotium rolfsii

Luffa cylindrica (*Lour.*) *Roehm.*
Botryodiplodia theobromae

Lycopersicum esculentum *Mill.*
Cladosporium fulvum
Leaf curl
Blossom-end rot, physiological disorder
Nematodes, root gall

Malvastrum tricuspidatum *A. Gray*
Tobacco leaf curl virus.

Mangifera indica *L.*
Armillaria mellea
Cephaleuros mycoidea

Manihot glaziovii *Muell. Arg. in Mart.*
Cercospora caribaea
——*henningsii*
Cassava mosaic virus.

——**utilissima** *Pohl.*
Absidia cristata
Armillaria mellea
Botryodiplodia theobromae
Cercospora caribaea
——*henningsii*
Fomes lignosus
——*noxius*
Ganoderma lucidum
Glomerella cingulata
Hypomyces ipomoeae
Irenina entebbeensis
Periconia (?) *pycnospora*
Rhizopus nigricans on dried tubers
——*nodosus* on dried tubers
Bunchy top (virus, indet.)
Cassava mosaic

Mariscus umbellatus *Vahl*
Cintractia limitata

Melanthera brownei *Sch. Bip.*
Irenina cyclopoda
Uromyces melantherae

Melinis minutiflora *Beauv.*
Sclerotium rolfsii

Merremia dissecta *Hall. f.*
Meliola malacotricha

Micrococca mercurialis *Benth. in Hook.*
Aecidium micrococcae

Mimusops (?) **elengi** *L.*
Cephalosporium acremonium (on *Phytophthora palmivora*)
Pestalozzia sp.
Phytophthora palmivora

Momordica charantia *L.*
——**foetida** *Schum*
Yellow mosaic (virus indet.)

Musa cavendishii *Lamb.*
Fusarium semitectum
Gibberella fujikuroi
Gloeosporium musarum
Glomerella cingulata
Stachylidium theobromae

——**paradisiaca** *L.*
Marasmius stenophyllus

——**sapientum** *L.*
Botryodiplodia theobromae
Chlamydomyces palmarum
Chloridium musae
Cordana musae
Fusarium oxysporum var. *cubense*
Gloeosporium musarum
Marasmius stenophyllus
Melanospora zamiae

——**schweinfurthii** *K. Schum. et Warb.*
Cordana musae

Nicotiana tabacum *L.*
Cercospora nicotianae
Phytophthora parasitica var. *nicotianae*
Pythium aphanidermatum
Leaf curl (virus)
Nematodes, root galls

Ocimum viride *Willd.*
Meliola microspora

Olax subscorpioides *Oliver*
Asterina connectilis

Oreodoxa oleracea *Mart.*
Cephaleuros mycoidea
Stem-bleeding, non-parasitic

Oryza sativa *L.*
Curvularia geniculata
——*lunata*
Helminthosporium oryzae
Nigrospora oryzae
Piricularia oryzae

Panax spp.
Phyllosticta sp.
Rhizoctonia solani

Pandanus sp.
Botryodiplodia theobromae

Panicum maximum *Jacq.*
Cercospora fusimaculans
Cerebella cenchroidis
Fusarium heterosporum f.1
Phyllachora heterospora
Ustilago heterospora

Paspalum conjugatum *Berg.*
Eudarluca australis (on rust)
Nigrospora sphaerica

——**scrobiculatum** *L.*, var.
Phyllachora sphaerosperma

Passiflora quadrangularis *L.*
Botryodiplodia theobromae
Sclerotium rolfsii

Paullinia pinnata *L.*
Dexteria pulchella
Meliola paulliniae

Pennisetum polystachyon (*L.*) *Schult.*
Cerebella cenchroidis
Cladosporium sp.

——**purpureum** *Schumacher*
Armillaria mellea
Phyllachora sp.

——**typhoides** (*Burm.*) *Stapf et Hubbard*
Cerebella cenchroidis
Fusarium sp.
Helminthosporium sp.
Puccinia penniseti
Sclerospora graminicola
Sphacelia sp.
Tolyposporium penicillariae

Persea americana *Mill.*
Armillaria mellea
Trachysphaera fructigena

Petroselinum sativum *Hoffm.*
Nematodes, root galls

Phaseolus coccineus *L.*
Rhizoctonia solani
Sclerotium rolfsii

——**vulgaris** *L.*
Rhizoctonia solani
Sclerotium rolfsii
Uromyces appendiculatus

——**lunatus** *L.*
Yellow mosaic (virus indet.)

Phialodiscus unijugatus *Radlk.*
Meliola thomasii

Phoenix sp.
Graphiola phoenicis

Phyllanthus amarus *Schum. et Thonn.*
Cercospora phyllanthi

——**discoideus** *Muell. Arg.*
Aecidium phyllanthi
Armillaria mellea

——**niruri** *L.*
Oidium sp.

Physalis angulata *L.*
Cercospora physalidicola

Physedra barteri *Cogn. in DC.*
Puccinia physedrae

Pilea sp.
Rhizoctonia solani

Piper nigrum *L.*
Nigrospora sphaerica

——**umbellatum** *L.*
Meliola piperina

Pistia stratiotes *L.*
Sclerotium rolfsii

Pittosporum sp.
Armillaria mellea

Placodiscus pseudostipularis *Radlk. in Sitz.*
Meliola thomasii

Plumbago capensis *Thunb.*
Meliola (?) *plumbaginis*

——**zeylanica** *L.*
Cephalosporium acremonium
Meliola plumbaginis

Pouzolzia guineensis *Benth. in Hook.*
Oidium sp.

Rauwolfia vomitoria *Afz.*
Armillaria mellea
Hemileia deightonii
Meliola similima

Ricinus communis *L.*
Cercospora ricinella

Rosa
Megalonectria pseudotrichia
Cephaleuros mycoidea

Rottboelia exaltata *L.*
Eudarluca australis (on *Puccinia rottboeliae*)
Helminthosporium sp.
Puccinia rottboeliae

Saccharum officinarum *L.*
Curvularia geniculata
——*lunata*
Helminthosporium sp.
Leptosphaeria sacchari
Nigrosphora sphaerica
Mosaic (virus)

Salvia coccinea *Bucholz ex Etl.*
Rhizoctonia solani

Sapindaceae
Meliola thomasii

Sarcocephalus esculentus *Afz.*
Coniosporium sp.

Scilla sp.
Sclerotium rolfsii

Secamone myrtifolia *Benth. in Hook.*
Meliola (?) *perpusilla* var. *congoense*

Sesamum orientale *L.*
Mosaic (virus indet.)

——**radiatum** *Schum. et Thonn.*
Cercospora sesami
Meliola microspora

Setaria chevalieri *Stapf*
Meliola substenospora
Ustilaginoidea sp. (aff. *ochracea*)

Sida carpinifolia *L.*
Irenopsis aciculosa
Tobacco leaf curl virus

——**rhombifolia** *L.*
Puccinia heterospora

——**urens** *L.*
Irenopsis aciculosa
Puccinia heterospora

Solanum melongena *L.*
Aecidium tubulosum

Sorghum arundinaceum (*Willd.*) *Stapf*
Cercospora sp.

——**durra** *Stapf*
Brachysporium sp.
Fusarium sp.
Helminthosporium sp.

——**vulgare** *Pers.*
Cercospora sorghi
Colletotrichum graminicola
Curvularia geniculata
——*lunata*
Eudarluca australis (on *Puccinia purpurea*)
Puccinia purpurea
Sphacelotheca sorghi
Bacterial stem blight, indet.
Striga (?) *senegalensis*

Spathodea campanulata *P. Beauv.*
Armillaria mellea

Spigelia anthelmia *L.*
Oidium sp.

Spondias mombin *L.*
Mucor inaequisporus

Sporobolus indicus (*L.*) *R. Br.*
Helminthosporium ravenelii

——**pyramidalis** *Beauv.*
Epichloe cinerea
Helminthosporium ravenelii
Marasmius sp.
(?) *Uromyces tenuicutis*

Strophanthus hispidus *DC.*
Asterina strophanthi
(?) *Darluca filum*
Hemileia buntingii
Hysterium sp.
Periconia (?) *pycnospora*
Pestalozzia sp.

Strychnos nux-vomica *L.*
Cephaleuros mycoidea

Tamarindus indica *L.*
Meliola tamarindi
Schizophyllum commune

Tephrosia vogelii *Hook. f.*
Stilbum sp.

Terminalia sp.
Armillaria mellea

Theobroma cacao *L.*
("On cocoa" indicates that the fungus occurs on the fermented, dried, raw product.)
Absidia capillata } (on cocoa)
—— *cristata* }
—— *regnieri* }
—— *truchisi* }
Armillaria mellea
Aspergillus candidus } (on cocoa)
—— *carbonarius* }
—— *chevalieri* }
—— *elegans* }
—— *fischeri* }
—— *flavipes* }
—— *flavus* }
—— —— var. *rufus* }
—— *fumigatus* }
—— *gracilis* }
—— *insuetus* }
—— *niger* }
—— *ochraceus* }
—— *sydowi* }
—— *tamarii* }
—— *wentii* }
Bacillus megaterium } (in fermentation)
—— *undulatus* }
(?) *Bacterium tumefaciens*

Theobroma cacao *L.*
Botryodiplodia theobromae
Calosphaeria sp.
Cephaliophora tropica (on cocoa)
Ceratostomella paradoxa
Choanephora cucurbitarum (on *Circinella spinosa* cocoa)
Colletotrichum coffeanum
Discella cacaoicola
Erwinia sp. (aff. *aroidea*)
Eutypella theobromicola
Fomes lignosus
—— *noxius*
Glomerella cingulata
Hansenula sp. (in fermentation)
Helminthosporium sp.
Heterosporium sp.
Hormodendrum sp. (on cocoa)
Hypomyces ipomoeae
Klöckeria sp. (in fermentation)
Macrophoma scaphidiospora
Marasmius byssicola
—— *equicrinis*
—— *scandens*
Megalonectria pseudotrichia
Mollisia sp.
Mucor buntingii (on cocoa)
—— *javanicus* (on cocoa)
Mycoderma sp (in fermentation)
Mycotoruloides sp. (in fermentation)
Nectria jungneri
Nigrospora sacchari (on cocoa)
Nummularia sp.
Penicillium cacaoicola (on cocoa)
—— sp. (on cocoa)
Phytophthora palmivora
Poria hypobrunnea
Pseudocamptoum fasciculatum
Rhizoctonia solani
Rhizopus nigricans (on cocoa)
Rosellinia (?) *arcuata*
—— sp.
Saccharomyces cerevisiae (in fermentation)
Scopulariopsis brevicaulis (on cocoa)
Syncephalastrum cinereum (on cocoa)
Syncephalis nana (on cocoa)
Thielavia setosa (on cocoa)
Trachysphaera fructigena
Ustulina zonata
Cephaleuros mycoidea
Loranthus sp.
Die-back, non-parasitic
"Swollen shoot," (?) deficiency disease
Helopeltis bergrothi, pod spots
Sahlbergella singularis, pod spots
—— *theobroma*, twig and branch cankers

Trema guineensis (*Schum.*) *Priemer*
Irenina tremae
Oothecium consimile

Trichilia heudelotii *Planch. ex Oliver*
Irenina sp.
Meliola sinuosa
Phaeodimeriella sp. (on *Irenina*)
Spegazzinia meliolae (on *M. sinuosa*)

Triumfetta rhomboidea *Jacq.*
Irenopsis coronata var. *vanderystii*

Urena lobata *L.*
Irenopsis molleriana

Urochloa insculpta *Stapf*
Puccinia sp.

Vanilla planifolia *Andr.*
Uredo scabies

Vetiveria fulvibarbis *Stapf*
Sorosporium sp.
—— **zizanoides** *Nash.*
Helminthosporium sp.
Meliola panici

Vicia faba *L.*
Rhizoctonia solani

Vigna unguiculata *Walp.*
Woroninella dolichi
Yellow mosaic (virus indet.)

Vitis vinifera *L.*
Plasmopara viticola

Voandzeia subterranea *Thou.*
Cercospora sp.
Pestalozzia sp.
Phyllosticta sp.

Xanthosoma sagittifolium (*L.*) *Schott.*
Armillaria mellea
Colletotrichum capsici
Fusarium solani
Pestalozzia versicolor
Phyllosticta colocasiae
Pythium sp. (aff. *gracile*)
Rhizoctonia melongena
—— *solani*
Sclerotium rolfsii
Root rot, indet.

Zea mays *L.*
Botryodiplodia theobromae
Cephalosporium acremonium
Cladosporium herbarum

Zea mays *L.*
Clasterosporium maydicum
Curvularia geniculata
—— *lunata*
Diplodia macrospora
Eudarluca australis (on *Puccinia maydis*)
Fusarium sp.
Gibberella fujikuroi
Helminthosporium (?) *rostratum*
—— *turcicum*
Marasmius sp.
Monilia sitophila
Nigrospora sphaerica
Ophiobolus heterostrophus
Papularia sphaerosperma
Pestalozzia sp.
Phoma zeicola
Physoderma maydis
Puccinia maydis
Rhizoctonia solani
Ustilago zeae
Bacterial stem rot and wilt, indet.
Leaf streak (virus)

FUNGI

Absidia regnieri
Syncephalis nana

Armillaria mellea
Hypomyces ipomoeae

Irenina sp.
Phaeodimeriella sp.
Spegazzinia meliolae

Meliola sinuosa
Spegazzinia meliolae

Meliolineae
Helminthosporium coffeae

Phytophthora palmivora
Cephalosporium acremonium

Puccinia maydis
—— **purpurea**
—— **repens**
—— **rottboeliae**
Eudarluca australis

INSECTA

Aspidiotus spp.
Calonectria diploa

Belanogaster colae
Beauveria bassiana

Coelaenomenodera elaedis
Beauveria bassiana
Hirsutella citriformis

Hymenoptera
Cordyceps sp.

Lecanium viride
Hypocrella reineckiana

Lepidoptera (larvae)
Isaria buntingii
Mycoderma sp.

Lepidosaphes pinnaeformis
Tetracium sp.

Locusta migratoria migratorioides
Aspergillus flavus

Locustids
Beauveria bassiana

Muscids
Cordyceps sp.

Mytilaspis citricola
Microcera sp.
Sphaerostilbe coccophila
Myriangium duriaei
Podonectria coccicola

(?) **Stictococcus** sp.
Hypocrella reineckiana

ARACHNIDAE

Isaria aburii
Gibellula pulchra

OTHER SUBSTRATA

Cheese
Aspergillus repens
——*ruber*
Penicillium sp.
Zygosporium echinosporum

Vegetable lard
Aspergillus chevalieri
—— *elegans*

XXX—ADDITIONS TO THE FLORA OF BORNEO AND OTHER MALAY ISLANDS: XVIII.*

THE OXFORD UNIVERSITY EXPEDITION'S SARAWAK COLLECTION, 1932: MISCELLANEOUS FAMILIES, INCLUDING OCHNACEAE, MELIACEAE, CUNONIACEAE AND THYMELAEACEAE. H. K. AIRY-SHAW.

Small type indicates matter not directly relevant to the Oxford University Expedition's collection.

ACTINIDIACEAE

Saurauia euryphylla *Airy-Shaw*, nom. nov.

S. amplifolia Merr. in Journ. As. Soc. Str. Br. **86**, 330 (1 Nov. 1922), non Diels in Engl. Bot. Jahrb. **57**, 452 (23 May 1922).

Dulit, secondary forest, under 300 m., 19 Aug., *Synge* 1348: "Fls. white, mainly on leafless lower part of stem. Height 2 m."

Vernacular name: *simpor rambi*.

Saurauia palawanensis *Merr.* in Philipp. Journ. Sci. 1914, **9**, 527 (1915).

Dulit, rain-forest, under 300 m., 6 Aug., *Native Collector* 1132: "Petals white, sepals reddish. Anthers purplish."

Apparently the first record of this Philippine species from Borneo.

Saurauia spinuloso-setosa *Merr.* in Journ. As. Soc. Str. Br. **79**, 32 (1918), *e descr.*

Dulit Ridge, moss-forest, 1200–1230 m., 10 Sept., *Native Collector* 1666: "Small tree, *c.* 3 m. high. Calyx green. Bristles on peduncles and young leaves bright red."

The same form, which differs slightly from the type, as described by Merrill, in the somewhat shorter petioles, less caudate leaves and more dense-flowered inflorescences, is apparently represented by *Moulton* 90 and 6715, from Lio Matu, Upper Baram.

Saurauia ferox *Korth.* in Temm. Verh. Nat. Geschied. Nederl. Overz. Bezitt. Bot. 132, t. xix (1839–42); Gilg u. Werderm. in Engl. Nat. Pflanzenf. ed. 2, **21**, 45 (1925).

Dulit Trail, rain-forest, under 300 m., 3 Aug., *Native Collector* 1087: "Small tree, *c.* 5 m. Fls. pure white."

Dulit, forest on edge of torrent, *c.* 400 m., 17 Nov., *Richards* 2623: "Tree, *c.* 5 m. high. Corolla white."

Saurauia ferox *Korth.* l.c., *sensu lato*; cf. Stapf in Trans. Linn. Soc. Bot. ser. 2, **4**, 134 (1894).

Dulit Trail, primary forest, 27 Aug., *Richards* 1491: "Shrub."

This specimen is not exactly matched by anything in the Kew Herbarium, but it would be useless to describe yet another new species in this critical alliance without revising the whole group. It would appear to come closest to *S. tewensis* Korth. and *S. Matthewsii* Merr.

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* Continued from K.B. 1939, 545.

Saurauia horrida *Hook. f.* in Trans. Linn. Soc. **23,** 162 (1860).

var. **adpressa** *Airy-Shaw*, var. nov. indumento omnino adpresso nec patente, petiolis subduplo longioribus distincta.

Sarawak, sine loc. exact., *Beccari* 967.

Dulit, second growth, under 300 m., 13 Aug., *Richards* 1248: "Shrub, 2 m. Petals white."

Dulit, forest by torrent, under 300 m., 24 Aug., *Native Collector* 1429 (typus): "Small tree, *c.* 3–4 m. high. Petals white, translucent."

Perhaps specifically distinct from *S. horrida*, but apparently only differing in the points mentioned. *Beccari* 3810 is very similar to var. *adpressa*, but has peduncles nearly twice as long and much fewer bristles on the stem.

Ochnaceae

Ouratea zeylanica (*Lam.*) *Alston* in Ann. Roy. Bot. Gard. Peradeniya, **11,** 209 (1929) et in Trim. Handb. Fl. Ceyl. **6** (Suppl.), 42 (1931); *vel aff.*

Ochna zeylanica Lam. Encycl. Méth. Bot. **4,** 512 (1783).

Ulu Koyan, sandy forest, 800–1000 m., 18 Sept., *Native Collectors* 1920: "Tree, 7 m. high. Petals greenish. Fruit reddish."

Vernacular name: *tema ubah.*

Ulu Koyan, Dulit, in "transition" forest, *c.* 1200 m., 7 Nov., *Richards* 2488: "Tree, *c.* 8 m. high. Petals and stamens bright yellow. Leaves very hard and stiff."

Ouratea Beccariana *Bartelletti* in Malpighia, **15,** 159, t. viii (1902); Gilg in Engl. u. Prantl, Nat. Pflanzenf. ed. 2, **21,** 74 (1925); *vel aff.*

Dulit Trail, primary forest on spur of mountain, *c.* 900 m., 29 Aug., *Richards* 1525: "Small tree, *c.* 9 m. high. Petals white. Fls. sweet smelling."

Ouratea neriifolia* *Bartelletti*, l.c. 158, t. vii (1902), e descr. et ic.; Gilg, l.c.

Dulit Trail, rain-forest on steep slope, 700–900 m., 19 Sept., *Native Collector* 1957: "Tree, 8 m. high. Petals white."

Euthemis leucocarpa *Jack* in Mal. Misc. **1,** no. 5, 16 (1820) et in Hook. Bot. Misc. **2,** 69 (1831); Planch. in Hook. Ic. Pl. **8,** t. DCCXI (1845); Bartelletti, l.c. 167 (1902); Ridl. FMP. **1,** 368; Gilg, l.c. 87 (1925); Richards in Journ. Ecol. **24,** 31 (1936).

Ulu Koyan, white sand forest, c. 800–850 m., 16 Aug., *Synge* 1870: "A characteristic species of this community. Also seen in abundance at Marudi. Shrub, *c.* 1·5–2 m. high. Petals white. Anthers bright yellow. Berries appear to be of two kinds, red and white."

Forest Reserve, Marudi, "heath" forest, frequent, under 300 m., Nov., *Richards* 2660; "Shrub, *c.* 1 m. high. Corolla white. Berries white."

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* Sphalm. "Neerifolia."

Euthemis Engleri *Gilg** in Engl. u. Prantl, Nat. Pflanzenf. ed. 1, III. **6,** 153, fig. 78 (1893); Richards in Journ. Ecol. **24,** 352 (1936).

E. minor Jack sec. Gilg in Engl. Pflanzenf. ed. 2, **21**, 87, fig. 45 (1925), non Jack.

E. Hackenbergii Diels in Engl. Bot. Jahrb. **60,** 310 (1926).

Dulit Ridge, moss-forest, *c.* 1240 m., 9 Sept., *Richards* 1647: " Shrub, *c.* 2·5 m. high. Fls. pinkish white."

Dulit Ridge, moss-forest, *c.* 1230 m., 9 Sept., *Richards* 1662: " Fls. rose pink."

Dulit Ridge, open moss-forest (absent in shady type), *c.* 1230 m., 5 Oct., *Richards* 2131: " Shrub, *c.* 1·5 m. high. Petals pale pink."

The status of this species is doubtful. It is certainly very closely allied to *E. obtusifolia* Hook. fil. (both are reduced to *E. minor* Jack by Gilg, l.c.) It appears, however, to be distinguishable by two associated characters: the shape of the leaves and their colour on drying. In shape the leaves are much broader and (in proportion) shorter than those of *E. obtusifolia* and more abruptly attenuate at the base. In drying they turn a decided chestnut colour, whereas those of *E. obtusifolia* turn blackish. The leaves of *E. minor* Jack resemble those of *E. obtusifolia* in shape, but are much thinner in texture. On the basis of these characters the following specimens are referable to *E. Engleri*:

Dutch S. E. Borneo. Heidewald vor Djihi, 21 Aug. 1908, *Winkler* 3268.

Sarawak. Top of Santubong, 840 m., 1890, *Haviland* " b.y.q.g."

Brit. North Borneo. Pantai Hill, Mengalong, 30 m., 12 July 1932, *Lumau* in *For. Dept.* 2607: " Tree [*sic* !]. Flower white. Fruit red." Vernacular name: *petikavo* (Kedayan).

This is no doubt the plant referred to by Winkler in Engl. Bot. Jahrb. **50,** Suppl.-Bd. 203 (1914), under the name *E. minor*, as forming closed associations over large areas in the subxerophilous primary forest or " heath-forest." (*Cf.* also Diels, l.c. 304.) Whereas Richards notes it as up to 2·5 m. in height, Winkler states that in Dutch S. E. Borneo it was at most 0·75 m.

Neckia distans *Ridley* in Journ. Roy. As. Soc. Str. Br. **49**, 12 (1907); Gilg in Engl. Pflanzenf. ed. 2, **21,** 81, line 3 from bottom† (1925).

Dulit Ridge, on ground and on rocks in valley near waterfalls, *c.* 1100–1230 m., 10 Sept., *Richards* 1672: " Petals white, sepals pale red."

The excellent material collected shows a considerable range of habit, from only 8 cm. high to stems 75 cm. in length. *N. distans* differs from all other species in its unusually short flower-stalks.

* This name, being accompanied by a figure with analyses, before Jan. 1, 1908, was validly published, and not merely a " nomen " as given in Ind. Kew. Suppl. VII.

† For *N. distans* Ridl. in line 4 from bottom (l.c.) read *N. malayana* Ridl.

The peduncle (as distinct from the pedicel) is frequently almost obsolete.

Neckia Klossii *Ridley* in Journ. Roy. As. Soc. Str. Br. **49,** 13 (1907).

var. **borneënsis** *Airy-Shaw*, var. nov. gracilior, foliis tantum usque 4·5 (nec 6) cm., sepalis paullo latioribus magis serratis tantum usque 4 (nec 5) mm. longis distincta.

Dulit Trail, mossy rocks in shade in primary forest on spur of mountain, *c.* 750 m., 27 Aug., *Richards* 1479 : " Petals white. Leaves rigid, almost chartaceous."

This agrees well with *N. Klossii* (from the Riau Archipelago) in the shape and conspicuous serration of the leaves, but the above differences seem sufficient to warrant varietal distinction.

Neckia obovata *Airy-Shaw*, sp. nov. foliis late obovatis obtusis vel rotundatis in genere distinctissima.

Herba suffrutescens, caule 3–34 cm. longo lignoso prostrato fere tota longitudine radicante. *Folia* apicem caulis versus conferta, late obovata, 3·5–8·5 cm. longa, 1·7–3·5 lata, basi stricte cuneato-attenuata, apice obtusa vel rotundata, raro subemarginata, minute apiculata, margine anguste reflexo tenuiter duplici-serrulata, serraturis sub lente incurvo-mucronatis, firme chartacea vel subcoriacea, glaberrima, siccitate supra fusco-grisea obscura sub lente obtuse vesiculoso-papillosa, subtus pallide griseo-viridia nitidula minutissime areolata vix papillosa ; costa supra impresso-prominula, subtus elevata ; nervi laterales fere patentes, recti, stricte paralleli, primarii et secundarii alternantes, circiter 1 mm. inter se distantes, supra pulchre insculpti vel obscuri, subtus levissime impressi ; petioli distincti, 3–4 mm. longi, crassiusculi ; stipulae setaceae, 3–4 mm. longae. *Pedunculi* 8–12 mm. longi ; bracteolae minimae ; pedicelli 1·5–2 cm. longi. *Sepala* lanceolata, 5–7 mm. longa, 1·5–2·5 mm. lata, acuta, haud conspicue serrulata, striato-nervosa, glabra. *Petala* ignota (omnia delapsa). *Staminodia exteriora* numerosa, clavata, 2–3 mm. longa. *Stamina* 5 : filamenta plana, subulata, 1·5 mm. longa ; antherae oblongae, fere 1·5 mm. longae, utrinque obtusae. *Staminodia interiora* 5, staminibus alterna iisque basi connata, subulata, 2 mm. longa. *Ovarium* oblongo-ovoïdeum, 3 mm. longum, 2 mm. diametro, glabrum, in stylum 2 mm. longum contractum, stigmate capitato. *Capsula* ovoïdea, 5 mm. longa, sepalis vix auctis.

Dulit, steep rocky slope in primary forest, under 300 m., 22 Aug., *Richards* 1381 : " Calyx pale green, corolla whitish. Leaves with velvety surface, leathery, brittle."

Dulit, primary forest on steep slope, under 300 m., 23 Aug., *Richards* 1413 (typus) : " Fls. greenish white. Leaves with ' velvet ' surface above."

The broadly cuneate-obovate leaf-shape at once distinguishes this from all other known species. Under a microscope, the " velvet " upper surface is seen to be due to the strongly papillose epidermis.

The papillae are, however, not acute, but at most hemispherical, each papilla consisting of the convex outer wall of each epidermal cell. With age, these rounded papillae apparently collapse or fall off, and the epidermis then presents a honeycomb-like appearance.

The following is a tentative key to the species of *Neckia* hitherto described.

Large plants ; leaves averaging 20 cm. long :
  Leaves 20–25 cm. long ; sepals 2–3 mm. wide.....1. **N. grandifolia** *Ridl.*
  Leaves 14–22 cm. long ; sepals narrower.....2. **N. serrata** *Korth.*
Small plants ; leaves averaging 10 cm. long or less :
  Leaves oblanceolate, acute :
    Peduncle + pedicel up to 1·5 cm. long.....3. **N. distans** *Ridl.*
    Peduncle + pedicel over 1·5 cm. long :
      Sepals lanceolate or ovate-lanceolate :
        Sepals enlarging in fruit.....4. **N. parviflora** *Ridl.*
        Sepals not or scarcely enlarging in fruit :
          Leaves over 15 mm. wide :
            Leaves not acuminate.....5. **N. lanceifolia** *Hook. f.*
                (*N. malayana* f. *minor* Ridley)
            Leaves acuminate...f. **major** (*Ridl.*) *Airy-Shaw*, comb. nov.*
          Leaves 5–15 mm. wide.....6. **N. humilis** *Hook. f.*
      Sepals filiform-subulate :
        Leaves up to 6 cm., sepals up to 5 mm. long.....7. **N. Klossii** *Ridl.*
        Leaves up to 4·5 cm., sepals up to 4 mm. long, more serrate.....
            var. **borneënsis** *Airy-Shaw*
  Leaves broadly obovate, obtuse.....8. **N. obovata** *Airy-Shaw*

N. ovalifolia Capitaine in Bull. Soc. Bot. France, **57,** 397, t. xiii, *B–F, L, M* (1910), from Dutch Borneo, is probably synonymous with *N. parviflora, N. lanceifolia* or *N. humilis*. The inadequate description, however, and the absence of measurements, make it impossible to place the species definitely. I have not yet had the opportunity of examining the original specimens in Herb. Bogor.

CAPPARIDACEAE

Capparis sp.

Dulit, primary forest, under 300 m., 12 Nov., *Native Collector* 2564 : " Shrub, under 1 m. high. Fls. white."

Near *C. Korthalsiana* Miq. and *C. Finlaysoniana* Wall. The genus is badly in need of revision, and a satisfactory determination seems at present scarcely possible.

POLYGALACEAE

Xanthophyllum macrophyllum *Baker* in Kew. Bull. 1896, 21.

Sungei Balapau, Ulu Tinjar, secondary forest, under 300 m., 1 Nov., *Richards* 2453 : " Shrub, *c.* 3 m. high. Calyx orange brown, corolla white."

Polygala venenosa *Juss. ex Poir.* Encycl. Méth. Bot. **5,** 493 (1804) ; Chodat, Mon. Polygal. in Mém. Soc. Phys. Hist. Nat. Genève, **31,** pt. 2, no 2, 98 (1893) ; Ridl. FMP. **1,** 138 ; Richards in Journ. Ecol. **24,** 31 (1936).

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* *N. malayana* var. *angustifolia* Ridley in Journ. As. Soc. Str. Br. 1907, **49,** 12 (1908), in obs. ; *N. malayana* f. *major* Ridl. FMP. **1,** 135.

Marudi, undergrowth of " heath " (white sand) forest, under 300 m., 25 July, *Richards* 1008 : " Weak shrub, *c.* 1 m. high. Wings of fl. crimson. Central part white, tinged with pink ; lower lip orange."

Salomonia cantoniensis *Lour.* Fl. Cochinch. 14 (1790) ; Ridl. FMP. **1,** 139 ; Merr. in Trans. Amer. Philos. Soc. n.s. **24,** pt. 2, 229 (1935).

Marudi, lawn on white sand, under 300 m., Nov., *Richards* 2647 : " Fls. purplish red."

Epirrhizanthes elongata *Bl.* Cat. Gewassen Buitenz. 82 (1823) ; Pilger in Engl. u. Prantl, Nat. Pflanzenf. Ergänzungsheft **2,** 190 (1906) ; Ridl. FMP. **1,** 140.

Dulit, on thick dead leaf carpet in damp rocky rain-forest near stream, under 300 m., 8 May, *Synge & Richards* 1153 : " Corolla white. Saprophyte."

TRIGONIACEAE

Trigoniastrum hypoleucum *Miq.* Fl. Ind. Bat. Suppl. 161, 395 (1860) ; Harms in Engl. u. Prantl, Nat. Pflanzenf. ed. 1, Nachtr. 209 (1897) ; Ridl. FMP. **1,** 142.

Dulit, primary forest on summit of ridge, under 300 m., 24 Oct., *Richards* 2324 : " Tree, *c.* 6 m. high. Corolla white."

Dulit, primary forest on crest of ridge, under 300 m., 5 Nov., *Richards* 2448 : " Tree, 12·9 m. high, 18 cm. diam. Petals white. Traces only of buttresses."

var. **oliganthum** *Airy-Shaw,* var. nov. foliis paullo magis coriaceis, inflorescentiis parvis dimidium foliorum vix aequantibus axillaribus haud vel vix in paniculas terminales aggregatis, floribus paullo majoribus.

Ulu Koyan, sandy rain-forest, 800–1000 m., 18 Sept., *Native Collector* 1921 (typus) : " Tree, 18 m. high, 16 cm. diam. Calyx green, petals white, upper lip with lemon yellow spot, 2 petals tubular. Leaves whitish below." Vernacular name: *tema kulit merah.*

Sarawak, sine loc. exact., *Beccari* 3161.

Further collections may show this plant to be sufficiently distinct to rank as a species. The most obvious difference lies in the much smaller inflorescences. There appears to be no structural difference in the flowers, and the fruits are unknown.

The following variety, not yet known from Sarawak, may conveniently be distinguished here :

var. **viride** *Airy-Shaw,* var. nov. foliis subtus viridibus concoloribus paullo tenuioribus, inflorescentia typica.

BRIT. N. BORNEO. Near Tawao, damp forested ravines, Oct. 1922–Mar. 1923, *Elmer* 21302 : " A tree, trunk 45 cm. in diameter, flowers white, fruits pale yellowish green."—*Vide* Merrill in Univ. Calif. Publ. Bot. **15,** 132 (1929).

Malay Peninsula. Penang: *G. Porter* in *Wallich* 7261. Ibid., road to Spout, 240 m., Aug. 1885, *Curtis* 387. Ibid., 180–300 m., May 1881, *King's Collector* 1680: "Tree 9–12 m. Fl. white." Perak: Tapa, Batang Padang, *Wray* 179 (typus, Herb. Kew.): "Tree, flower white." Larut, open jungle, top of mountains, 150–300 m., Jan. 1883, *King's Collector* 3784: "A tree 18–21 m. high. Stem 37·5–45 cm. diam. Leaves bright green. Fruit light yellow." Ibid., dense jungle, rich soil, 150–240 m., Oct. 1886, *King's Collector* 6768: "A tree 15–18 m. high. Stem 25–37·5 cm. diam. Leaves glossy light green. Flower creamy white with a yellow centre." Ibid., Gunong Bubu range, 150–240 m., June 1885, *King's Collector* 7709: "A tree 12–18 m. high. Stem 25–37·5 cm. diam. Leaves bright green. Flower white. Fruit light greenish yellow."

This is the plant distributed by Wallich as *Isopteris penangiana* Wall., but never described. It apparently agrees with Miquel's species in everything but the foliage.

Guttiferae

Garcinia (Sect. **Discostigma**) sp., aff. *G. sarawhensi* Pierre, Fl. For. Cochinch. **1,** Enum. Esp. Garc. p. vi (ante t. 54) (1882); **2,** t. 91, fig. G-H (1883).

Dulit Ridge, open moss-forest, *c.* 1400 m., 8 Nov., *Richards* 2506: "Shrub, *c.* 3 m. high."

In very young bud, insufficient for description.

Garcinia (Sect. **Campylanthera**) sp., aff. *G. cuneifoliae* Pierre, l.c. **1,** Enum. p. xxxv (1882); **2,** t. 90, fig. B (1883).

Dulit Ridge, edge of exposed cliff on crest of mountain, *c.* 1400 m., 13 Sept., *Richards* 1771: "Shrub, *c.* 3 m. high. Fls. greenish white."

Apparently a new species, but flower-buds too young for description.

Simaroubaceae

Eurycoma longifolia *Jack* in Roxb. Fl. Ind. ed. Carey et Wall. **2,** 307 (1824); Ridl. FMP. **1,** 362; Engl. et Harms in Engl. Nat. Pflanzenf. ed. 2, **19a,** 381 (1931).

Marudi, "heath" (white sand) forest, under 300 m., 25 July, *Richards* 1012: "Slender tree, *c.* 6 m. high. White latex. Leaves crowded near top."

Vernacular name: *kaba bruang.*

Meliaceae

Walsura grandifolia *Ridley* in Kew Bull. 1930, 370; Harms in Engl. Nat. Pflanzenf. ed. 2, **19b I,** 119 (1940); *vel aff.*

Dulit, primary forest on slope of ridge, under 300 m., 21 Oct., *Richards* 2304: "Shrub, 75 cm. high. Fls. greenish white. Anthers bright yellow. Leaves glaucous beneath."

The material consists of one leaf and one small inflorescence. The leaflets are thinner than in the type-specimen (*Kalong* in *Haviland* 1635), not bullate, with more slender and less spreading nerves, and shorter petiolules. These differences may, however, be due to age.

Dysoxylum arborescens (*Bl.*) *Miq.* in Ann. Mus. Bot. Lugd.-Bat. **4,** 24 (1868) ; Ridl. FMP. **1,** 391 ; Harms, l.c. 162 (1940).

Goniocheton arborescens Bl. Bijdr. 177 (1825).

Dulit, rain-forest, under 300 m., 31 July, *Richards* 1030 : " Undergrowth tree, *c.* 6 m. Flowers greenish white, sometimes tinged with pink."

Dysoxylum fulvum *Airy-Shaw*, sp. nov., *D. papilloso* King affine, sed foliolis subtus multo minus pubescentibus vel fere glabris, inflorescentiis 3–12 cm. longis ut innovationes dense fulvo-tomentosis, alabastris oblongis conspicue 4-angulatis (nec globosis) differt.

Frutex 5 m. altus. *Ramuli* usque 8 mm. crassi, juniores conspicue angulati breviter fulvo-tomentelli, vetustiores subteretes, glabrescentes, cortice pallide cinereo-brunneo. *Folia* bijuga (abnormaliter 1-juga), foliolo terminali etsi in foliis valde immaturis innovationum viso tamen in maturis semper aborto ; rhachis (petiolo 10–15 cm. longo incluso) 16–24 cm. longa, 2–4 mm. crassa, angulata, ima basi pulvinato-incrassata, parce fulvo-tomentella. *Foliola* opposita, inferiora minora, elliptica vel oblongo-elliptica, 12–18 cm. longa, 4–7·5 cm. lata, superiora majora, 21–34 cm. longa, 7–12 cm. lata, omnia basi plus minus cuneata, apice abruptiuscule breviter tenuiter caudata, cauda 1–2 cm. longa, margine integro fere plano, sicut in *D. papilloso* sucoso- vel subcarnoso-coriacea, unde siccitate irregulariter rugosa, sub lente utrinque dense papillosa, utrinque pallide viridia supra tamen magis griseo-viridia, costa nervisque subtus exceptis glabra ; costa 2 mm. crassa, supra prominula glabra, subtus elevata parce breviter pubescens ; nervi laterales graciles, 10–15-jugi, supra tenuiter insculpti, subtus argute prominentes, inferiores subrecti, superiores magis procurvi, prope marginem evanescentes nec anastomosantes ; venulae ultimae tenuissimae, supra omnino obscurae, subtus evidentiores, luce transmisso translucentes visae. *Inflorescentiae* simpliciter racemosae, 3–5 cm. longae, sub fructu usque 12 cm. auctae, axillares, 5–10 mm. supra petiolum suffulcientem exortae, pallide flavo-fulvo-velutinae, rhachi 2–3 mm. crassa, bracteis minutis triangularibus 1 mm. longis, pedicellis 1–2 mm. longis saepe praeter florem terminalem alabastra 2 minuta aborta lateralia gerentibus. *Calyx* brevissime cupularis, 3–5 mm. diametro, 1–2 mm. altus, brevissime 4-dentatus, dentibus latissime triangularibus, extra sericeo-tomentosus, intus glaber. *Petala* 4, oblonga, 6–8 mm. longa, circiter 3 mm. lata, apice triangulari-inflexa, valvata, extra breviter sericea, intus glabra nisi apicem versus parce puberula. *Tubus staminalis* 5–6 mm. longus, 2–3 mm. diametro, tetragonus, glaber, brevissime 8-crenulata, crenulis truncatis ; antherae 7–8, oblongae, 1 mm. longae, sessiles, 1 mm. infra apicem tubi affixae. *Discus* cupularis, vix 1 mm. altus, extra glaber, intus pubescens, obscure undulatus. *Ovarium* ovoïdeum, circiter 1 mm. altum, 4-loculare, fulvo-sericeum, in stylum attenuatum. *Stylus* 4 mm. longus, basi subattenuatus, pubescens, superne crassior, glaber ; stigma discoïdeum vel

pileiforme, convexum, vix 1 mm. diametro, glaber. *Fructus* ignotus.

Dulit, primary forest, under 300 m., 17 Oct., *Richards* 2242 : " Shrub, 5 m. high. Bark 1 mm. thick. Fls. greenish white, sweet scented."

Very close to *D. papillosum* King (group **Aaα13,** Harms, l.c. 163), but sufficiently distinguished by the almost glabrous leaves and very differently shaped flower-buds. The perforations in the leaves referred to by King in Journ. As. Soc. Beng. **64** (2), 51 (1895) also occur in this species, but they can scarcely be regarded as a character of taxonomic value !

Dysoxylum undulatum *Henderson* in Gard. Bull. Straits Settlem. **7,** 90 (1933) ; Harms, l.c. ; *vel sp. peraff.*

D. rugulosum King *sec.* Ridley, Fl. Mal. Penins. **1,** 397 (1922), *quoad loc.* " Selangor, Sempang Mines," non King.

Dulit Ridge, moss-forest, *c.* 1300 m., 8 Nov., *Native Collector* 2504 : " Small tree, *c.* 6 m. high. Fruit orange."

Although this specimen is in fruit only, and the leaves have dried badly, I have very little doubt that the above affinity is correct. The small group of shrubby species represented by *D. rugulosum* King, *D. undulatum* Hend., *D. papillosum* King and *D. fulvum* A.-S. is very distinct by reason of the thick, almost fleshy texture of the leaves, and the reduced inflorescences. (*D. alternatum* Ridley, l.c. supra, is not closely allied.) The fruits collected by the Oxford University Expedition are shortly pyriform or fig-like, depressed at the apex, 5–5·5 cm. long, 4·5 cm. in diameter, woody, 4-valved, externally somewhat longitudinally venose and minutely red-brown-tomentellous, the pericarp 1–2 mm. thick ; about 4 seeds seem to be developed, which are compressed-obovoid, 1·5–2 cm. long, 2–2·3 cm. in diameter. The discrepancies between these and the fruits of *D. undulatum* probably indicate a variety, but flowering material will be necessary before a definite conclusion can be reached.

The following specimen (referred to above under the synonym " *D. rugulosum* ") is certainly referable to *D. undulatum* :

Malay Peninsula. Selangor : Sempang Mines, April 1911, *Ridley* 15908.

Chisocheton rhytidocalyx *Airy-Shaw*, sp. nov., *C. pauciiugo* Miq. (*C. spicato* Hiern) atque *C. erythrocarpo* Hiern affinis, ab illo calyce ruguloso et petalis 6, ab hoc indumento (praecipue foliolorum paginae inferioris) minute puberulo, ab utroque inflorescentia magna paniculata copiose longeque ramosa recedit.

Arbor, statura ignota, trunco circiter 42 cm. diametro. *Ramuli* usque 1 cm. crassi, cortice longitudinaliter striato-subfisso brunneo minute puberulo. *Folia* 20–40 cm. longa, usque 8-jugata, apice foliolis nondum evolutis terminata, rhachi lateraliter compressa 3–4 mm. crassa minute subfulvo-cinereo-velutina. *Foliola* valde asymmetrica ; infima (juga 2–4) breviter oblique oblonga vel

ovato-oblonga, 5–10 cm. longa, 3–5 cm. lata ; superiora oblique vel subfalcatim oblonga vel lanceolato-oblonga, 15–22 cm. longa, 5–8 cm. lata ; omnia basi latere postico cuneata, latere antico late cuneata usque rotundata, apice abrupte breviter caudata cauda 1–2·5 cm. longa 1–3 mm. lata, margine integra siccitate undulata conspicue anguste revoluta, tenuiter chartacea, supra sub lente dense minute sed distincte glanduloso-punctulata, primum minute puberula, mox glabrescens, siccitate surde viridi-brunnea, subtus glandulis obscurius notata, saltem secus venas persistenter puberula, siccitate subcastanea ; costa supra leviter impressa, sparse puberula, subtus elevata, dense subvelutino-puberula ; nervi laterales graciles, 15–18-jugi, infimi fere patentes, superiores patuli, subrecti, prope marginem procurvi et anastomosantes, supra tenuiter impressi, sparse puberuli, subtus elevati, densius puberuli ; venuli ultimi gracillimi, inter secundarios laxe scalariformiter dispositi, inter se vix anastomosantes ; petioluli brevissimi, vix 3 mm. longi, sicut rhachis breviter velutini. *Paniculae* axillares, 35–65 cm. longae, copiose longeque ramosae ; rhachis breviter cinereo-velutina, varie angulato-compressa, basi usque 5 mm. crassa ; rami patuli vel suberecti, longiores (inferiores) circiter 4–8, usque 45 cm. longi ; ramuli florigeri (secundarii) usque 2·5 cm. longi, nodulosi, breviter brunneo-fulvo-sericei, patuli. *Flores* mediocres, subsessiles, in ramulis racemose dispositi. *Alabastra* oblonga, 1·2 cm. longa, 5–6 mm. crassa. *Calyx* breviter cylindricus, 6–7 mm. longus, breviter 4-dentatus, dentibus late deltoïdeis, rugulosus, extra breviter fulvo-sericeus, intus glaber. *Petala* 6, anguste spatulata, 1·6–1·7 cm. longa, 3–4·5 mm. lata, basi in unguem 1–1·5 mm. latum angustata, apice obtusiuscula et incrassata, imbricata, sub anthesi revoluta, extra dense brevissime sericeo-tomentella, intus glabra, alba, siccitate nigro-brunnea. *Tubus staminalis* in alabastro oblongo-ellipsoïdeus, circiter 9 mm. longus, sub anthesi clavato-cylindricus, 1·3 cm. longus, superne 3–4 mm. diametro, extra longe sericeus, basin versus et intus glaber, 8–9-dentatus, dentibus circiter 2 mm. longis anguste triangularibus apice truncatis emarginatis superne glabris. *Antherae* 8–9, oblongo-lanceolatae, leviter curvatae, circiter 2 mm. longae, subapiculato-acutae, basi sinuum inter dentes fere basifixae, glabrae. *Discus* annularis, sericeus. *Pistillum* (indumento incluso) anguste lanceolatum, alabastro 9 mm. longum, sub anthesi 1·2 cm. longum, ovario minuto ut videtur 4-loculare in disco fere immerso, stylo longissime densissime fulvo-sericeo apice per 3 mm. glabro, stigmate parvo discoïdeo apice depresso inferne annulato. *Fructus* ignotus.

Dulit Trail, primary forest on steep slope, *c.* 400 m., 26 Aug., *Richards* 1460 : " Tree, 17 ins. [42 cm.] diam. Corolla white. Fls. with sickly sweet smell. Timber useful."

This is apparently related to *C. pauciiugus* Miq., *C. Beccarianus* (Baill.) Harms, *C. erythrocarpus* Hiern, and *C. pauciflorus* King, but has a far larger inflorescence ; in fact, the branches of the

panicle are longer than in any other species known to me. In its rugulose calyx and 6-petalled flowers it is nearest to *C. erythrocarpus*. In his recently published treatment of the *Meliaceae*, Harms (l.c. 151, 153) refers the above four species to four different groups—§ 3 *Pauciflori*, § 7 *Dasycolei*, § 5 *Sandoricocarpi*, and § 4 *Grandiflori* respectively. I do not, however, feel great confidence in this arrangement, particularly in view of the author's inconclusive treatment of the *Clemensia* group (l.c. **155**, top of page).

Aglaia Curtisii *King* in Journ. As. Soc. Beng. **64** (2), 71 (1895); Ridl. FMP. **1,** 408.

Dulit Trail, rain-forest on steep slope, 700–900 m., 19 Sept., *Native Collector* 1959: "Tree, 20 m. high, 20 cm. diam. White latex."

Vernacular name: *peniau gunong*.

Apparently not previously recorded for Borneo, though there are two sheets (leaf and inflorescence) of *Beccari* 1214 in Herb. Kew., one of which bears a pencilled determination as *Aglaia Curtisii* King in that author's handwriting.

Aglaia cordata *Hiern* in Hook. f. FBI. **1,** 557 (1875); Ridl. FMP. **1,** 409; Harms, l.c. 145 (1940); *var.*

Dulit, primary forest, under 300 m., 23 Oct., *Richards* 2320: "Shrub, *c.* 3 m. high."

Dulit Trail, rain-forest on steep ridge, *c.* 550 m., 9 & 10 Aug., *Richards* 1172: "Tree, *c.* 10 m."

Dulit, undergrowth of rain-forest, under 300 m., 31 Sept., *Richards* 1040: "Small tree, under 5 m. Inflorescence pale golden brown."

Vernacular name: *kayu kaseh*.

SAPINDACEAE

Otophora fruticosa (*Roxb.*) *Bl.* Rumphia, **3,** 142 (1847), in obs.; Radlk. in Engl. Pflanzenr. IV. **165** (Sapind.), 759 (1932).

Sapindus fruticosus Roxb. Fl. Ind. (ed. Carey), **2,** 283 (1832).

Dulit, primary forest on hill slope, under 300 m., 15 Aug., *Richards* 1281: "Slender shrub, 1 m. high. Petals white."

The only inflorescence present arises from an older branch (as described for *O. cauliflora* Merr.), and is an unbranched raceme of fascicles. This appears, however, to be an accidental abnormality and I have little hesitation in referring the specimen to Roxburgh's species.

Nephelium lappaceum *L.* Mant. **1,** 125 (1767); Ridl. FMP. **1,** 499; Radlk. l.c. 957 (1932); *var., vel sp. aff.*

Dulit, secondary forest on river bank, under 300 m., 14 Oct., *Richards* 2214: "Tree, about 8–10 m. high. Petals white."

The specimen is in male flower only. The leaflets are longer and the nerves more numerous than is usual in this species, but in other respects it appears typical.

Weinmannia dulitensis *Airy-Shaw*, sp. nov., ex affinitate *W. negrosensis* Elm., a qua foliis plerumque 7-foliolatis, foliolis lateralibus basi rotundatis, costa subtus pubescente distinguitur.

Arbor parva, circiter 8 m. alta, ramis usque 5 mm. diametro vix vel inconspicue lenticellatis, junioribus dense breviter tomentellis, vetustioribus glabris. *Folia* 1–4-(plerumque 3-)juga, 7–17 cm. longa (petiolo folioloque terminali inclusis) ; petioli 1·3–3 cm. longi, 1–2 mm. crassi, ut rhachis nec alati nec carinati, fere teretes, brevissime tomentelli ; stipulae reniformi-orbiculares, 1–1·5 cm. latae, integrae, margine revolutae, utrinque minute puberulae vel supra basin versus tomentellae. *Foliola* plerumque oblonga vel elliptica, rarius plus minus ovata vel obovata, 3–9 (plerumque 6–7) cm. longa, 1–3·4 cm. lata, lateralia basi rotundata (saepe inaequaliter), terminalia in pseudo-petiolulum brevem cuneato-angustata, omnia apice modice caudato-acuminata, margine anguste revoluta, subcrenato-serrata, crenaturis subrectis haud profundis, firme coriacea, siccitate rubido-castanea (subtus laetius) ; costa supra argute impressa, basin versus minute puberula, subtus prominens, dense breviter tomentella vel interdum glabrescens ; nervi laterales 9–13-jugi, late patuli, quoquoversus anastomosantes, reticulum venularum densum valde conspicuum supra planum pallidum in mesophyllo fusco subtus elevatum fere concolor efficientes, venulis subtus parce puberulis, mesophyllo subtus obscure puncticulato et minutissime brevissime puberulo. *Inflorescentiae* ex axillis ultimis (raro etiam paenultimis) exortae. *Pedunculi communes* singuli vel bini, 2–5 mm. longi, valde lateraliter plano-expansi, pubescentes. *Racemi* 5–9 cm. longi, simplices vel raro ramulo subbasali 2–3 cm. longo aucti, dense minute puberulo-tomentelli. *Flores* non visi. *Capsulae* obovoïdeae, 3–4 mm. longae, minute puberulae, stylis circiter 1 mm. longis ; pedicelli 1–2 mm. longi ; calycis puberuli discique glabri lobi persistentes, 0·75 mm. longi. *Semina* pilis inclusis 4 mm. longa.

Dulit Ridge, forest near waterfall, *c.* 1200 m., 10 Sept., *Native Collector* 1671 : " Small tree, *c.* 8 m. high. Fruit reddish brown."

Very similar to *W. negrosensis* Elm. in leaf-texture and venation, but readily distinguished by the more numerous leaflets, the lateral ones being rounded, not cuneate, at the base, and by the pubescent midrib. Distinguished from *W. borneënsis* Engl. (till the recent description of *W. Clemensiae* van Steenis the only known Bornean species ; see below) by the very much larger, firmly coriaceous leaves, conspicuously elevate-reticulate beneath.

Weinmannia borneënsis was originally published in a conspectus of species with a 2-line " description " in German, no collector or type-specimen being indicated. It seemed desirable to take the opportunity, afforded by the loan to Kew of the type-specimen from Berlin, to provide an adequate description in Latin. An unmounted duplicate of the type collection was afterwards found at Kew.

Weinmannia borneënsis *Engl.* in Engl. u. Prantl, Nat. Pflanzenf. ed. 2, **18a,** 256 (1930), descr. hic amplif. *Airy-Shaw.*

Rami fusci, brevissime adpresse puberuli. *Folia* 1–4-juga, usque 12 cm. longa (petiolo folioloque terminali inclusis), rhachi (pet. incl.) usque 6 cm., petiolo usque 2·5 cm. longis infra dense cinereo-tomentellis. *Foliola* subsessilia, plerumque ± ovato-lanceolata sed etiam elliptica vel oblonga vel obovata, terminalia 5–6·5 × 2·5 cm., lateralia 2·8–5·5 × 1·8–2·3 cm., acute acuminata, recte crenato-serrata, satis coriacea, supra fusca, subtus rubro-brunnea, glabra, vix lucentia; costa infra prominens, dense cinereo-tomentella, supra impressa, glabra; nervi primarii laterales 9–12-jugi, graciles, latiuscule patuli, ad sinum cujusque dentis percurrentes, ramulo secundario ad sinum dentis proximi inferioris saepe emisso, infra minute puberuli; stipulae cito caducae, ex unica relicta suborbiculares, 8·5 mm. diametro. *Racemi* bini e ramulis brevissimis 1–4 mm. longis pubescentibus ex axillis terminalibus seriatim ortis enati, 5–6 cm. longi, minutissime puberuli, inferne per 5–20 mm. nudi. *Pedicelli* patentes, fasciculatim orti, 1–2 mm. longi, subadpresse puberuli. *Flores* tetrameri. *Sepala* minima, ovata, obtusa. *Petala* late obovata, circiter 1 mm. longa, reflexa. *Filamenta* 2·5 mm. longa, basi glandulis 2 oblongis carnosis instructa; antherae sphaeroïdeae. *Ovarium* ovoïdeum, 1·5 mm. longum, crispule sericeum, in stylos 2 subulatos glabros 1·5 mm. longos abiens. *Fructus* ignotus.

Sarawak. Sine loc. vel dat., *Native Collector* 722 (Herb. Berol., Herb. Kew.).

Weinmannia aphanoneura *Airy-Shaw*, sp. nov., nulli speciei asiaticae ut videtur affinis, *W. eriocarpae* Tul. Madagascariensi quoad foliorum formam subsimilis, sed foliolis crassius coriaceis nervis utrinque valde obscuris et insuper floribus pedicellatis abunde diversa; ab omnibus speciebus malaicis foliolis 1–7 mediocribus anguste oblanceolatis crasse coriaceis nervis valde obscuris recedit.

Frutex circiter 4 m. altus, ramis usque 5 mm. diametro conspicue verruculoso-lenticellatis minute puberulis mox glabrescentibus. *Folia* 3–7-foliolata, 5–8 cm. longa (petiolo folioloque terminali inclusis); petioli 1–2 cm. longi, usque 1 mm. crassi, ut rhachis haud alati sed distincte lateraliter angulati vel subcarinati, minute puberuli. *Stipulae* subreniformi-orbiculares, circiter 8 mm. diametro, subtus basin versis adpresso-puberulae. *Foliola* cuneato-oblanceolata, rarius oblongo-oblanceolata, 2–4·5 cm. longa, 8–17 mm. lata, basi (saepe longe sensimque) cuneata, apice subacuta usque subobtusa, margine (basi excepta) distanter nec profunde subcrenato-serrata, serraturis subrectis, saepe leviter et angustissime recurva, crasse et rigide coriacea, glaberrima, siccitate supra griseo-viridia, subtus castanea et sub lente obscure puncticulata; costa supra leviter impressa, subtus valida, elevata; nervi laterales immersi, nec impressi nec elevati, plerumque difficillime visu, 6–8-jugi, patuli, plus minus arcuato-anastomosantes. *Racemi* ex apice pedunculi communis 2–3 mm. longi minute puberuli binatim orti, 3–4 cm. longi, foliis multo breviores, sub lente minutissime puberuli. *Flores* non visi. *Capsulae* obovoïdeae, 2–2·5 mm. longae, adpresse pubescentes, stylis gracilibus 1·5 mm. longis; pedicelli filiformes, 2–3 mm. longi, minutissime puberuli; sepala 4, persistentia, minuta, ovata, 0·7 mm. longa, obtusa, glabra.

Dulit Ridge, open moss-forest, *c.* 1400 m., 11 Sept., *Richards* 6716 : " Shrub, *c.* 4 m. high. Fruit crimson."

The material consists of a single branch only, in fruit. In its almost invisible nerves immersed in the rigidly coriaceous leaflets the species differs from all Asiatic species known to me.

THYMELAEACEAE

Amyxa pluricornis (*Radlk.*) *Domke* in Biblioth. Bot. **27,** Heft 111, **5**, 33, 117, et passim (1934).

Gonystylus pluricornis Radlk. in Sitzber. math.-phys. Kl. K. Bayer. Akad. Wiss. 1886, **16,** 329 (1887) ; H. Hallier in Meded. 's Rijks Herb. Leid. **44,** 15 (1922).

Amyxa kutcinensis Van Tiegh. in Ann. Sci. Nat. sér. 7, **17,** 248 (1893).

Dulit, primary forest on hillside, under 300 m., 3 Sept., *Richards* 1604 : " Tree, *c.* 30 cm. diam. Fls. greenish white, sweet scented."

Vernacular name : *soma merah.*

In addition to the Haviland number (3073) cited by Hallier (l.c.), there are in the Kew Herbarium two other hitherto unrecorded gatherings of this interesting plant.

SARAWAK. Santubong (?)*, 1891, *Haviland* 494 (d.k.d.b.). Gat [Sungei Gaat], Upper Rejang River, forest slopes, 1929, *J. & M. S. Clemens* 21687 : " Tree 50 ft. [15 m.], fl. green-yellow."

Mt. Dulit is about 120 miles N.N.E. of S. Gaat, whose confluence with the Rejang lies some 200 miles E.N.E. of Kuching.

The ripe fruit of *Amyxa* is still unknown ; cf. Domke, l.c. 34. None of the collections which I have seen shows any sign of setting it. This leads one to suspect that fertilisation may be of rare occurrence, and may account for the comparative rarity of the tree.

It may be pointed out that Van Tieghem's original description of the genus *Amyxa* was entirely anatomical, without the mention of a single morphological character. It seems undesirable that such descriptions should be regarded as validating the publication of the names concerned. The genus should therefore be cited as **Amyxa** *Van Tiegh. ex Domke*, l.c. 116 (1934), whose excellent German description was published just before the much-deferred date (1 Jan. 1935) for obligatory Latin diagnoses (Art. 38).

Aquilaria Cumingiana (*Decne.*) *H. Hallier* in Meded. 's Rijks Herb. Leid. **44,** 17 (1922).

Gyrinopsis Cumingiana Decne. in Ann. Sci. Nat. sér. 2, **19,** 41, t. 1, fig. B (1843).

var. **parviflora** *Airy-Shaw*, var. nov., floribus maturis tantum 10–11 mm. (nec 13–15 mm.) longis et 1–2 mm. (nec 3 mm.) latis, foliis interdum pro rata brevioribus latioribusque distincta.

Near Kuching, 7 Sept. 1892, *Kalong* for *Haviland* 1610 : " Small tree ; flower pale yellow." Ibid., 11 Feb. 1893, *Haviland* 2297 :

* Haviland's query, not mine.

" Shrub. Calyx lobes white. Anthers yellow." Ibid., 1893, *Haviland* 3072, 3092 (" =1610 ") (typus, Herb. Kew.). Baram, April 1895, *Hose* 592. Mt. Matang, forest, near trail, 450 m., 27 Oct. 1929, *J. & M. S. Clemens* 22356 : " Shrub 15 ft. [4·5 m.] high ; flower white ; fruit green."

Dulit Trail, primary forest on steep slope, *c.* 400 m., 26 Aug., *Richards* 1462 : " Tree, over 20 m. high., diam. about 25 cm. Bark light coloured. No buttresses (tree prob. immature). Corolla white. Timber useful."

Vernacular name : *gaharu* (S. Malay).

I have made *Haviland* 3092 the type of this variety as it is the only specimen with an abundance of open flowers. There are a few on *Haviland* 1610 and *Clemens* 22356, but those on *Haviland* 2297 and *Richards* 1462 are all in bud.

It is the Dulit specimen which shows leaves of the proportionally broader and shorter type referred to in the diagnosis. Many of them are less than twice as long as broad : e.g. the largest leaf measures 16×9 cm., and this represents the average proportion. The great majority of the leaves on Haviland's specimens are indistinguishable in size and shape from Cuming's Philippine material, except for one leaf of *Haviland* 1610, which measures 13·2×6·8 cm. and is indistinguishable from the leaves on Richards' Dulit collection, except that the latter are somewhat more prominently nerved. As in the Philippines plant, scattered adpressed hairs are present on the lower leaf-surface (especially near the midrib) in all the Bornean specimens ; in *Hose* 592 they are copious.

Linostoma leucodipterum *H. Hallier* in Meded. 's Rijks Herb. Leid. **44,** 28 (1922).

Dulit, primary forest on summit of steep ridge, under 300 m., 17 Aug., *Richards* 1312 : " Woody liane climbing on tree, c. 80 ft. [24 m.] high. Petals white, sepals pale green."

At first taken for a distinct species on account of the broader, more oblong-ovate, strongly mucronate leaves and smaller, oblanceolate bracts, but a specimen from British North Borneo (Gaya Island, *Haviland* 1440) connects it with the type, from W. Dutch Borneo, kindly loaned to Kew from the Leiden Herbarium.

XXXI—ON THE FLORA OF THE NEARER EAST: XXII.*

New Records and New Species from Greece and the Greek Islands. W. B. Turrill.

Brassica cretica *Lam.* var. **nivea** (*Boiss. et Spr.*) *O. E. Schulz.*

Crete : distr. Candia, Mt. Kóphino, between Trees Ekliseëa and Koudhoumás, on the south coast, 150–300 m., 7.3.1940, limestone cliffs, *Peter Davis* 1238.

Stem branching, purplish, up to 3 feet in height, springing from a rosette of slightly glaucous leaves with a rather purplish midrib.

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* Continued from K.B. 1939, 480.

Petals creamy white ; sepals and anthers yellow. Inflorescence with about 12 lateral branches.

The subdivisions of this species have been worked out by Onno (Oesterr. Bot. Zeitschr. **82,** 312 : 1933). The variety *nivea* was originally described as a species (Boiss. Diagn. I. i. 72 : 1842) from Acrocorinth. It is probably nothing more than a petal colour variation within the species, the other supposedly differential characters given being nothing more than fluctuations.

Cephalaria Sieberi *Szabó* in Engl. Bot. Jahrb. **57,** 643 (1922) et in Mag. Bot. Lap. **25,** 51 (1926). (Subgenus *Fimbriatocarpus* Szabó).

Cyclades : Amorgos, near the place called Stavros, between Langádha and Kríkilos, 460 m., on limestone cliffs in company with *Seseli crithmifolium* and *Senecio bicolor*, with *Anthyllis aegaea* growing near by. Very rare, only one plant found after prolonged search and that on the big cliff east of Stavros, 8.10.1939, *Peter Davis* 961.

Shrubby, leaves coriaceous, dark green with a light midrib ; flowering stems up to 2 ft., simple or branched.

C. Sieberi is closely related to *C. balearica* Coss., which is known only from the Balearic Islands (" Majorque : sur les rochers, exposés au Nord, de la Sierra entre 430 et 900 mètres," and Ivice, sec. Knoche Flor. Balear. **2,** 436–7 : 1922). Knoche uses the name *C. rigida* (L.) Schrad., Roem., et Schult. var. *balearica* (Coss.) Knoche, but *C. rigida* is a South African species placed by Szabó (1926) in a different subgenus—*Lobatocarpus* Szabó.

C. Sieberi was discovered by Sieber in Crete " in rupib. Sphak." and there are two sheets of his collecting at Kew. In addition there are specimens from Karpathos (Scarpanto), *K. H. Rechinger* fil. 8203, and from Ikaria (Nikaria), *Forsyth Major* 915. Szabó (1926) gives the following differences between *C. Sieberi* and *C. balearica* : *C. Sieberi* : Paleae oblongae, acutae ; folia oblongo-lanceolata. *C. balearica* : Paleae spathulatae, subobtusae ; folia elliptico-lanceolata.

Iris planifolia (*Mill.*) *Fiori et Paoletti*, Flor. Anal. Ital. **1,** 227, (1896). *Xiphium planifolium* Mill. Gard. Dict. ed. 8 (1768) ; Bot. Mag. t. 6352 (1878) as *Xiphion planifolium*. *Iris alata* Poir. Voy. Barb. **2,** 86 (1789) ; Dykes, " The Genus Iris " 193 (1913).

S. W. Crete : dry limestone hills above Palaióchora, 150 m., 29.2.1940, *Peter Davis* 1190 ; between Voutá and Palaióchora, Nov. 1939, in fruit, *Peter Davis* 1037.

There is a certain range of variation in the characters of plants placed in *I. planifolia* and the question of " local races " might repay investigation. The pollen grains have the minute spines over the surface as recorded by Dykes for this species and *I. palaestina*. All the characters of the Cretan material, in so far as they might be considered of taxonomic value, are found in certain specimens from more western localities. Such characters include : size below the

average, leaves strongly recurved, and spathe-valves somewhat inflated and equal in length to, or even slightly exceeding, the tube.

Dykes (l.c.) gives the distribution of the species as Spain, Sardinia, Sicily, and the north coast of Africa.

Muscari commutatum *Guss.* Pl. rar. 145 (1826).

CRETE : Sitia, low hills behind the town, 17.3.40, *Peter Davis* 1310. Flowers dark indigo, paler in the bud.

This species is apparently fairly widely distributed in S. Italy and in Sicily (see Flor. Ital. Exsicc. 515). In the Balkan Peninsula it is common in Attica and also occurs in other parts of Greece and in the Cyclades. There are also records for Macedonia and Istria. The records for Syria, Palestine, and Iraq (see Boiss. Flor. Or. **5**, 296 : 1884) are doubtful.

Bellevalia brevipedicellata *Turrill*, sp. nov. ; a *B. dubia* (Guss.) R. et S. foliis latioribus brevioribusque, pedicellis brevioribus praecipue differt.

Bulbus ovoideo-globosus vel ovoideus, usque ad 3·3 cm. longus et 2·5 cm. diam., tunicis pallide brunneis. *Folia* 2–3, lanceolato-linearia, superne plus minusve attenuata, apice acuta, 4–17 cm. longa, 1·2–2·1 cm. lata, crassiuscula, glabra, grosse undulata, margine eciliata angustissime membranacea (in siccitate), inferne saepe rubra. *Caules floriferi* 1–3, 6–17·5 cm. alti, 2–2·5 mm. diam., glabra, saepe irregulariter rubro-brunneo-maculati ; racemus 1·8–5·6 cm. longus, 9–25-florus ; bracteae lineari-lanceolatae, plus minusve acuminatae, sagittatae vel laciniatae, 2–4 mm. longae, membranaceae, rubicundae ; bracteolae bracteis subsimiles sed minores et angustiores ; pedicelli vix 1–1·5 mm. longi. *Perigonium* tubulosum, 7 mm. longum (lobis inclusis), ore circiter 4 mm. diametro, album (lobis exceptis) : lobi late ovati, acuti 2·5–3 mm. longi, 2·5 mm. lati, leviter reflexi, exteriores dorso bigibbosi, interiores unigibbosi, pallide rubicundi, fascia viride instructi. *Filamenta* 2 mm. longa, alba, circiter 4·5 mm. supra tubi basem posita ; antherae 1·5 mm. longae, laete purpureae ; pollinis granula coerulea. *Ovarium* globoso-ovoideum superne subtrigonum, 2·5 mm. altum, 2 mm. diametro, coeruleum ; stylus 2·5 mm. longus, albidus. *Capsula immatura* obovoideo- vel subspheroideo-trigona, leviter emarginata, 1·5 cm. alta, 1·5 cm. diam., coccis acute lateraliter compressis hemisphericis 7 mm. latis loculis 1–2 seminis instructis, stylo persistente.

S. W. Crete : limestone rocks on open hillside near Palaióchora, near sea-level to 154 m., growing with *Stachys spinosa* L., *Biarum Davisii* Turrill, and *Thymelaea argentea* (S. et S.) Endl., 29.2.1940, *Peter Davis* 1223. Found also at Panagía Krisoskalítissa, near Kouneni.

The flowers are scentless and after fertilization fade to brown with a lighter median band. The upper flowers do not usually

seed but appear to be perfectly formed with complete androecium and gynoecium.

Generic limits in the *Scilloideae* are notoriously difficult to draw. The genus *Bellevalia* (*Bellevallia*—see Asch. u. Graebn. Syn. **3,** 265, 1905) has by different authors been sunk in *Hyacinthus*, united with or kept distinct from *Hyacinthella*, or its species variously relegated to *Scilla*, *Muscari*, and other genera. N. Feinbrun (Palestine Journ. Bot. **1,** 42 : 1938 and l.c. 131 : 1938) discusses the delimitation of the genus and maintains that "the species of *Bellevalia* differ in several important characteristics from the allied genera and thus constitute a natural group of generic value." The publication of Feinbrun's series of papers is not yet (May 1940) complete. *B. brevipedicellata* apparently belongs to the section *Patens* and perhaps to her subsection *Cavaraea* (Mattei) Feinbr. which has "two species of the S.E. corner of the Mediterranean having sessile or subsessile flowers and indehiscent pods shedding as a whole at maturity." Unfortunately mature fruits of *B. brevipedicellata* are not yet available but the flowers are certainly subsessile. What the two species of the subsection may be is not stated in the parts so far published, but one presumes that *B. sessiliflora* (Viv.) Kunth from Egypt and Libya, is one of them. From the species our plant differs in the shorter and broader leaves, the distinct (if very short) pedicels, and the slightly emarginate immature capsules. *B. dubia* (Guss.) R. et S., with which *B. brevipedicellata* is compared above, is known from Italy, Sicily, Crete, Greece, Corfu, and Dalmatia.

Fritillaria Davisii *Turrill*, sp. nov. ; a *F. macrandra* Baker foliis latioribus, stylo breviore ramis longioribus differt.

Bulbus late ovoideus, circiter 10 mm. altus et 8–10 mm. diam. *Caulis* 2·0–2·7 dm. altus, 2 mm. diam, 1-(rarissime 2-) florus, glaber, viridis vel inferne (supra solum) leviter purpurascens. *Folia* viridia, 2 infima opposita (vel subopposita), caetera omnia spiralia ; infima elliptica vel oblongo-elliptica, obtusa vel subobtusa, inferne plus minusve angustata, 4·4–7·1 cm. longa, 1·35–3·2 cm. lata, media lanceolata vel anguste elliptico-lanceolata, suprema anguste lanceolata superne angustata. *Perigonium* campanulatum ; tepala 2–2·5 cm. longa, apice obtusa vel rotundata papillosa, exteriora elliptico-oblonga 7–9 mm. lata, interiora elliptico-obovata 12–13 mm. lata, omnia haud reflexa extra purpureo-brunnea glauca inconspicua vel vix tessellata fasciis haud manifestis intus flavo-virentia vinoso-tessellata. *Filamenta* gracilia, 8 mm. longa, leviter papillosa ; antherae (post dehiscentiam) oblongae, 3·5–4·5 mm. longae, apiculatae, flavae ; stylus 2·5 mm. longus (ramis tribus 6–7 mm. longis exclusis).

GREECE : Laconia, Māni promontory near Pyrgos south of Areopólis, 16.2.1940, 92 m., in young olive plantations, *Peter Davis* 1152. Also found between Yeroliména and Porto Kālio, on the same promontory, among phryana on the limestone hills. Vernacular name ἀγγουρί (angouri).

This interesting new plant is related to *F. macrandra* Baker and to *F. ionica* Hal. and occurs in an intermediate geographical area. *F. macrandra* Baker was described (Gard. Chron. 1875, 715–6) from the island of Syra where it had been collected by Elwes. Unfortunately both the type specimen (at Kew) and the original description leave much to be desired. *F. rhodocanakis* Orph. was a *nomen nudum* in Atti congr. Firenze, 1874, 214, but had an English description attached to the name by Baker in Journ. Bot. N.S. **7**, 323 (1878). The type locality is the island of Hydra. So far as can be ascertained from the available data the plants from Syra and Hydra belong to the same species and the name *F. macrandra* has to be retained for it. However, until more and better material is obtained from Syra a doubt remains as to their identity. There is excellent material now available from Hydra. *F. ionica* Hal. is recorded from Aetolia, Corfu, Epirus, and Albania. The tepals are said to be " sordide virentia, apicem versus margine rubello-tincta " and tessellated. The leaves are all or nearly all opposite. The filaments are said to be glabrous, but this may be incorrect.

Colchicum Cupani *Guss.* Flor. Sic. Prodr. **1**, 452 (1827).

CRETE : near Khersónisos, distr. Candia, 92 m., 15.12.39, low limestone hills in company with *Ranunculus bullatus* and *Crocus laevigatus, Peter Davis* 1096.

Stefanoff, Monogr. Gatt. Colchicum, 52–53 (1926), gives the distribution of the species as : Cyclades, Greece, Cephalonia, Epirus, Sicily, Sardinia, S.E. France, Tunisia, and Algeria. The Cretan material runs down to *C. Cupani* in his key but has broader leaves (up to 1·3 cm. broad) than most of the specimens seen from Sicily and the Balkan Peninsula. Gussone, l.c. 8, however, has a variety *latifolium* which he describes as " foliis semipedalibus pollicem latis."

XXXII—NEW SPECIES AND RECORDS FROM TIBET.

The regions quoted in brackets are those from which the species has been previously reported.

Corydalis Jigmei *C. E. C. Fischer et K. N. Kaul*, sp. nov. [Papaveraceae] ; a *C. hsiaowutaishanensi* T. P. Wang foliis minoribus magis dissectis, bracteis ovatis vel flabellatis dissectis differt.

A small *herb* ; roots several, napiform, slender, up to 4 cm. long ; collar bearing a number of fleshy scales, the outer circular, flat, subacute, 1·1 cm. long, the inner gradually smaller, the innermost ellipsoid ; stems and leaves arising from their axils. Radical *leaves* long-petioled, twice ternate, fleshy, blades and their primary divisions circular in outline, the former 1–1·2 cm. diam., the secondary deeply 2–3-fid, the terminal less deeply than the lateral, into subacute, oblong or obovate segments ; petiolules 1·2 mm. long, deeply channelled above ; petiole narrow, flat, 3–4 cm. long,

with a strong midrib and a slender longitudinal nerve on either side. Flowering *stems* several, 3·5–4 cm. long, like the petioles but with 3 equal longitudinal nerves; floral-leaf sessile, broadly ovate or flabellate in outline, 6–8 mm. long, deeply cut into 5 or 7 linear, subacute segments, often purplish at the tip. *Racemes* terminal, few-flowered; lower bracts flabellate, up to 6·5 mm. long, deeply 3–4-lobed, upper reduced and 2-lobed or entire and lanceolate; pedicels up to 2·7 mm. long. *Sepals* very minute, entire or 2-lobed, early caducous. *Outer anterior petal* circular when expanded, subacute, 6 mm. long, abruptly narrowed into an obconic claw 3·2 mm. long, 2 mm. wide at apex, apex winged; *outer posterior petal* broadly boat-shaped, obtuse, 8 mm. long, 2 mm. deep in the middle, broadly winged, the spur rather saccate, 4 mm. long; *inner petals* broadly oblong, obtuse, not reaching to the apices of the outer petals, 4 mm. long, 2 mm. wide, bearing a thick, hollow, longitudinal fold outside. *Stamens* 5 mm. long. *Ovary* ellipsoid, compressed, 3 mm. long; ovules 15–20; style rather stout, compressed, 2·5 mm. long; stigma expanded. *Fruit* not seen.

Phari to Tremo-La, 4600 m., fls. June, *B. J. Gould* 2160. In dried specimens the tips of the petals, at least of the inner ones, are bluish-purple and the fold on the inner petals is a lurid green. The specific epithet is in commemoration of H.H. the Maharaja of Bhutan at Mr. Gould's request.

Corydalis Kingdonis *Airy-Shaw*, nom. nov. [Papaveraceae]; *C. Wardii* Marq. et Airy-Shaw in Journ. Linn. Soc. Bot. **48**, 161 (1929), non W. W. Smith in Notes Roy. Bot. Gard. Edinb. **9**, 100 (1916).

Mr. Fischer has kindly pointed out to me the need for a new name here, and in Mr. Marquand's absence I take this opportunity of supplying it. H.K.A.S.

Corydalis Zambuii *C. E. C. Fischer et K. N. Kaul*, sp. nov. [Papaveraceae]; *C. crista-galli* Maxim. affinis, foliis subcarnosis magis dissectis, sepalis cordatis caudatis basifixis, corolla breviore, petalorum alis integris, calcare breve recurvo distat.

A small *herb*; rootstock not seen; stems sinuous, rather fleshy, up to 13 cm. long, somewhat thickened upwards, striate. *Leaves* (radical not seen) sub-fleshy, alternate, imparipinnate, blade 3–6 cm. long, linear-oblong or narrowly ovate-oblong in outline; pinnae 3–4 pairs and a terminal, alternate or sub-opposite, a basal one sometimes unpaired, 5–10 mm. long, broadly ovate in outline, the terminal flabellate, all 3–5 pinnatisect and again divided into 2–3 subacute, obovate or oblong segments, lower shortly petiolulate, upper sessile, decurrent; petioles flat, up to 4·5 cm. long, widened and vaginate at the base. *Racemes* terminal, subglobose, densely many-flowered; up to 2·5 cm. diam.; bracts broadly ovate, 3–4 mm. long and nearly as wide, denticulate, terminating a broad 1-costate claw up to 4 mm. long and 1·5 mm. wide, the blade (when dry) green

with a broad or narrow reddish-purple zone along the apical margin, the claw pale; pedicels up to 3·5 mm. long. *Sepals* cordate, basifixed, caudately acuminate, 3·5–4 mm. long, 2–3 mm. wide, margins lacerate, speckled with brown. *Outer anterior petal* oblong, 9·5 mm. long, 1·8 mm. wide, widest at the 2-lobed apex, lobes rounded, 3 mm. diam., keeled along the upper half, broadly winged at the apex; *posterior outer petal* deeply boat-shaped, 1·1 cm. long (excluding the spur), 2 mm. deep, apex broadly winged, spur stout, strongly recurved, 2·5 mm. long; *inner petals* oblong, 5·5 mm. long, 2·5 mm. wide at the apex and a little less at the base, broadly winged. *Ovary* ellipsoid, compressed, 4·8 mm. long; ovules 10; style 4 mm. long; stigma slightly expanded, lobulate. *Fruit* not seen.

Rama to Dumpa Gompa, 4950 m., fls. end June, *Gould* 2275. In dried specimens the petals are yellowish more or less flushed with pinkish-purple, especially at the tips.

The species is named after Mr. Gould's orderly who greatly helped with the collections.

Draba sikkimensis (*Hook. f. et Thoms.*) *Pohle* [Cruciferae] (Sikkim).

Rama to Dumpa Gompa, 4900 m., fls. end June, *Gould* 2263; Linji La, 5200 m., fls. early July, *Gould* 2289.

Viola bulbosa *Maxim.* [Violaceae] (Chamba, W. China).

Jelep La to Yatung, 3900 m., fls. end May, *Gould* 2026.

Acer Papilio *King* [Aceraceae] (Sikkim).

Yatung to Gautsa, 3770 m., fls. June, *Gould* 2107.

Ribes desmocarpum *Hook. f. et Thoms.* [Grossulariaceae] (Sikkim, Bhutan).

Yatung to Lachung La, 3900 m., fls. early June, *Gould* 2031; Yatung to Gautsa, 3770 m., fls. mid June, *Gould* 2106, 2108.

Ribes Griffithii *Hook. f. et Thoms.* [Grossulariaceae] (Sikkim, Bhutan).

Yatung to Gautsa, 3770 m., fls. mid June, *Gould* 2104.

Ribes laciniatum *Hook. f. et Thoms.* [Grossulariaceae] (Sikkim, Bhutan).

Yatung to Lachung La, 3900 m., fls. early June, *Gould* 2034.

Viburnum cordifolium *Wall.* [Caprifoliaceae] (Kumaon to Bhutan).

Yatung to Lachung La, 3900 m., fls. May-June, *Gould* 2048.

Gentiana algida *Pall.* var. **parviflora** (*C. B. Clarke*) *Kusnez.* [Gentianaceae] (Sikkim).

Linji La, 5200 m., fls. July, *Gould* 2285.

Gentiana depressa *D. Don* [Gentianaceae] (Garhwal to Sikkim.)

Near Phari, 4450 m., fls. Sept., *Gould* 1631. Published descriptions of this apparently uncommon species furnish practically no

dimensions and it is thought advisable to give them here :—*Plant* about 4 cm. high. *Surculi* up to 10 cm. long ; leaves on them ovate, up to 5 mm. long. *Leaves* on flowering caudex up to 1·7 cm. long and 1·2 cm. wide. *Calyx-tube* 1–1·2 cm. long ; lobes 7·5–9 mm. long, 8·5–9·5 mm. wide, overlapping and shortly decurrent on the tube as is the keel. *Corolla-tube* 3 cm. long, 1·6 cm. wide at the mouth ; lobes 5 mm. long, 6 mm. wide ; folds about half as long. *Stamens* inserted 1–1·2 cm. above the base of the corolla ; filaments 9–12 mm. long ; anthers 4 mm. long, versatile. *Stipe* of ovary 6–8 mm. long. *Ovary* 1–2 cm. long style 5·5–6·5 mm. long ; stigmas 3·5 mm. long, puberulous in the upper half.

Gentiana phyllocalyx *C. B. Clarke* [Gentianaceae] (Sikkim, W. China).

Rama to Melong Gompa, 4670 m., fls. early July, *Gould* 2315.

Gentiana venusta (*Wall.*) *Griseb.* [Gentianaceae] (Kashmir to Sikkim).

Bhutan-Tibet frontier East of Phari, 4900 m., fls. Aug., *Gould* 1417 A.

XXXIII—NOTES ON CAREX: XV.* E. Nelmes.

New African and Indian Species.

Carex leribensis *Nelmes*, sp. nov. ; affinis *C. glomerabili* Krecz., sed foliis angustioribus, inflorescentiis minoribus, utriculis late ovatis brevioribus basi rotundatis ore bidentulis differt.

Rhizoma breviter stoloniferum, caespitosum, lignosum. *Culmi* 20–35 mm. vel ultra alti, laeves. *Folia* inflorescentia breviora, 1–2 mm. lata, subplana, sicca viridia. *Spicae* circiter 5–10, androgynaeceae, simplices, inferiores setaceo-bracteatae, inflorescentiam ovoideam densam 1–1·7 cm. longam formantes. *Squamae femineae* ovatae, acutae vel acuminatae, castaneae, marginibus albo-hyalinae, viridi-carinatae, interdum mucronatae. *Utriculi* 2·5–3 mm. longi, 1·5–2 mm. lati, squamis longiores latioresque, demum subdivaricati, late ovati, plano-convexi, glabri, dorso pallide virides haud nitidi, indistincte pauci- vel plurinerves, ventre demum brunnei et nitidi, enerves vel basi indistincte plurinerves, superne angustissime marginati, basi lati et subcordati, haud stipitati, in rostrum breve latum marginibus scabriusculum ore bidentulum sensim attenuati. *Nux* ovata, breviter rostrata. *Stigmata* 2.

Basutoland : Leribe Plateau ; 1500–1800 m., *Mrs. A. Dieterlen* 758.

Carex Schlechteri *Nelmes*, sp. nov. ; affinis *C. glomerabili* Krecz., sed foliis latioribus, inflorescentiis majoribus, utriculis magis distincte nervatis basi rotundatis differt.

Rhizoma breviter stoloniferum, lignosum. *Culmi* 38–54 cm. alti, inferne laeves, superne scabriusculi, subvalidi, triquetri, basi

* Continued from K.B. 1940, 162.

vaginis aphyllis paucis circumdati. *Folia* inflorescentia breviora, 3–7 mm. lata, plana, subrigida, sicca pallide flavo-viridia, subcoriacea. *Spicae* numerosae, androgynaeceae, late ovatae, superiores simplices, inferiores compositae, setaceo-bracteatae, inflorescentiam oblongo-lanceolatam densam interdum subinterruptam 3–4 cm. longam formantes, demum stramineo-brunneae. *Squamae femineae* ovato-lanceolatae, acutae vel acuminatae, castaneae, marginibus albo-hyalinae, viridi-carinatae, saepe scabriusculo-mucronatae. *Utriculi* circiter 4–5 mm. longi, squamis plerumque paullo longiores, demum subdivaricati, ovato-lanceolati, plano-convexi, demum stramineo-brunnei, haud nitidi, glabri, tenuiter sed distincte utrinque plurinerves, basi rotundati, breviter vel brevissime stipitati, superne marginati, in rostrum sublongum latum marginibus scabrum antice fissum ore bidentatum sensim attenuati. *Nux* orbiculato-ovata, breviter valde stipitata, brevissime rostrata. *Stigmata* 2.

South Africa: Eastern Cape Province; Transkei, in wet places near Bashee, 1600 m., 16 January 1895, *Schlechter* 6286 (type); Great Winterberg Mountains, 2280 m., 8 March 1900, *Galpin* 5602.

Carex Schlechteri has been identified with *C. vulpina* L. by Kükenthal, Clarke, and all other authors who have included the *Carices* in their publications on the flora of South Africa. By "*C. vulpina* L." most of these authors, or at least those among them with some knowledge of European sedges, meant the common western European plant which has been shown (Journ. Bot. **77**, 259 : 1929) to be not the true *C. vulpina* L. but a distinct species the name of which is apparently *C. Otrubae* Podp. *C. Schlechteri* differs from this in its rather narrower leaves, its inflorescence tapering upwards, its more acuminate, white-edged glumes, and in its rather smaller and narrower utricle, which passes more gradually into a beak with more finely and regularly serrated margins.

Carex subinflata *Nelmes*, sp. nov.; affinis *C. clavatae* Thunb., sed utriculis minoribus oblongo-ellipsoideis tenuiter nervatis demum divaricatis, rostris subteretibus laevibus praecipue differt.

Culmi usque 60 cm. alti, laeves, subvalidi, foliati. *Folia* inflorescentiam subaequantia, 5–8 mm. lata, sicca marginibus revoluta, glaucescenti-viridia, coriacea. *Spicae* 4–5 approximatae sed infima distans, superiores 1–2 masculae, subclavato-cylindricae, ceterae 3–4 femineae, cylindricae, crassae, 2·5–4·5 cm. longae, inferiores exserte pedunculatae, superiores plerumque incluse pedunculatae. *Bracteae* foliaceae, inferiores inflorescentiam superantes, longi-vaginantes, superiores inflorescentiam aequantes, breviter vaginantes. *Squamae femineae* late ovatae, apice saepe bilobae, rufae, carinatae, mucronatae. *Utriculi* squamis longiores, 5–6 mm. longi, ellipsoidei vel oblongo-ellipsoidei, demum horizontaliter divaricati, subcoriacei, subinflati, fulvi, rufo-maculati, glabri, indistincte tenuiter nervosi, in rostrum modice longum rectum subteres marginibus

laeve ore bidentatum abrupte contracti. *Nux* laxe inclusa, obovata, trigona, breviter stipitata, longe rostrata. *Stigmata* 3.

South Africa: Eastern Cape Province; Barkly East, Doodman's Krans Mountain, 2600 m., 7 March 1904, *Galpin* 6882 (type).

Basutoland: Leribe Plateau; 1500–1800 m., *Mrs. A. Dieterlen* 601 (p.p.), 860. *Dieterlen* 601 at Kew is a mixture, the other plant, which is immature, being apparently *C. drakensbergensis* C. B. Clarke.

Carex eluta *Nelmes*, sp. nov.; affinis *C. Walkeri* Arn., sed planta tota minor, inflorescentiis pallidioribus, utriculis minoribus fusiformi-ellipticis nervis validioribus praeditis in rostrum subsensim abeuntibus differt.

Culmi 65–90 cm. alti, foliati, laeves. *Folia* inflorescentia breviora, 4–7 mm. lata, plana, subcoriacea, superne scabriuscula; vaginae foliorum inferiorum rubro-brunneae. *Inflorescentia* paniculata, interrupta. *Spicae* numerosae, in fasciculos 5–6 remotos dispositae, plerumque androgynaeceae sed nonnunquam illae fascicularum superiorum omnino masculae, praeterea paucae fascicularum inferiorum omnino femineae, laxiflorae, simplices vel ramosae, inferiores inaequaliter breviter vel longe vel longissime exserte pedunculatae, superiores incluse vel breviter exserte pedunculatae; pedunculi capillares. *Bracteae* foliaceae, longivaginantes, plerumque inflorescentia breviores sed interdum eas subaequantes. *Squamae femineae* late oblongo-ovatae vel oblongo-obovatae, tenues et pallido-brunneae, superne marginibus albo-hyalinae, apice obtusiusculae, carinatae, e carina in aristam longam scabriusculam excurrentes. *Utriculi* 5·5–6 mm. longi, fusiformi-elliptici, plerumque squamis aristatis longiores, suberecti, trigoni, glabri, nitidi, superne marginibus parce hispiduli, plurinerves, pallide virides, basi attenuati breviter stipitati, in rostrum longum subconicum pallidum marginibus parce hispidulum ore albidum subsensim attenuati. *Nux* oblonga, trigona, arcte inclusa. *Stigmata* 3.

India: Madras; Nilghiri Hills, 17 March 1870, *Clarke* 11002 (type); 18 March 1870, *Clarke* 11033; 19 March 1870, *Clarke* 11065; Sispara, 1800 m., May 1889, *Gamble* 20613.

Carex angustifructus (*Kükenth.*) *Nelmes*, sp. nov.; affinis *C. atrofuscae* Schkuhr, sed foliis latioribus, spicis longioribus, utriculis longioribus angustioribus in rostrum longius sensim attenuatis differt.—*C. atrofusca* var. *angustifructus* Kükenth. in Engl. Pflanzenr. IV. **20** (Cyperac.—Caricoid.), 554 (1909).

Culmi 17–40 cm. alti, stricti vel apice leviter curvati, laeves, inferne foliati. *Folia* culmo multo breviora, 4–5 mm. lata, plana, subrigida, interdum leviter curvata, acuminata. *Spicae* 4–5, 1·5–2 cm. longae, circiter 8–10 mm. diametro, plerumque cylindrico-ellipsoideae, approximatae vel infima remotiuscula, densiflorae, capillari-pedunculatae (pedunculi laeves), cernuae, suprema mascula raro gynaecandra, ceterae femineae. *Bracteae* inferiores breviter

foliaceae, longivaginantes, superiores squamiformes, breviter vaginantes. *Squamae femineae* anguste oblongo-lanceolatae, acuminatae, atro-brunneae, carinatae, carina interdum straminea. *Utriculi* plerumque squamis parum longiores et latiores, 5·5–6 mm. longi, plani, anguste elliptici, inferne pallidi, superne atro-brunnei, basi brevissime stipitati, in rostrum sublongum interdum minute scabrum ore breviter bidentatum sensim desinentes. *Stigmata* 3.

India : Sikkim ; Tungu, 3600–3900 m., 23 July 1849, *Hooker f.* ; Yeumtong, 4500 m., 6 September 1849, *Hooker f.*

Nepal ; *Wallich* 3389a ; western Nepal, Nampa Gádh, 3900–4200 m., 27 July 1886, *Duthie* 6109.

Carex hypsobates *Nelmes*, sp. nov. ; affinis *C. coriophorae* Fisch. ex Kunth, sed foliis brevioribus, spicis minoribus haud pallidis, terminali feminea vel apice mascula, squamis castaneis, utriculis minoribus late ovatis praecipue differt.

Rhizoma stoloniferum. *Culmi* 10–25 cm. longi, laeves, apice cernui, graciles. *Folia* 2–5 mm. lata, culmo multo breviora, subplana, e basi culmi aggregatim orta. *Spicae* 2–3, plus minusve ellipsoideae, 1–2 cm. longae, plerumque femineae sed interdum terminalis apice mascula, densiflorae, approximatae vel infima subdistans, subfastigiatae, cernuae, pedunculatae. *Bracteae* inferiores squamiformi-foliaceae, breves, vaginantes, superiores squamiformes, breviter vel vix vaginantes. *Squamae* ovatae vel ovato-lanceolatae, apice acutae vel acuminatae, carinatae, castaneae vel atro-rubrae, superne marginibus et apice late albidae. *Utriculi* circiter 4 mm. longi, squamas vix superantes sed iis multo latiores, late ovati, plani, enerves, glabri, superne rubro-brunnei, inferne pallidi, superne marginibus pallidi papillosi et saepe parce setulosi, in rostrum breve pallidum marginibus parce setulosum ore tenue albidum bidentatum subsensim attenuati. *Stigmata* 3.

India : Kashmir ; Nubra, 4500–5100 m., 28 August 1848, *Thomson* (type) ; ascent to Lanak Pass, 4750 m., 13 September 1847, *Thomson*.

Another gathering which appears to be conspecific with *C. hypsobates*, but which needs further study, is one of Jacquemont's, collected " trans Riobrong Ghât, Kunawar."

XXXIV—MISCELLANEOUS NOTES.

Sir Frank Stockdale, K.C.M.G., who has been Agricultural Adviser to the Secretary of State for the Colonies since 1930, has been appointed to the newly created post of Comptroller of the West Indian Welfare Fund. This post has been established in connection with the Recommendations of the recent West India Royal Commission and the Government's statement of policy on Colonial Development and Welfare.

He is succeeded as Agricultural Adviser by Dr. H. A. Tempany, C.B.E., who has been Assistant Agricultural Adviser since 1936.

Mr. A. J. Wakefield, who was promoted Director of Agriculture, Tanganyika Territory, in 1938, has been appointed Inspector General of Agriculture in the West Indies by the Secretary of State for the Colonies. He will form one of the team of experts under the direction of the Comptroller.

Professor S. Schonland.—The death of Professor Schonland on 24th April at the age of 79 at his son's farm near Grahamstown, removes a very well known figure from the botanical life of South Africa. He was a prominent member of the older school of botanists consisting of Medley Wood, Bolus, Macowan, Guthrie, Marloth, and others.

Schonland was a German by birth and was educated at the Universities of Berlin and Kiel. At Berlin, and later at Oxford, he assisted the Professor of Botany. He went to South Africa in 1889 and shortly afterwards was appointed Director of the Albany Museum at Grahamstown. In 1904 he became the first Professor of Botany at Rhodes University College, resigning in 1925 to settle on his son's farm at Aylesby, some miles from Grahamstown. Of late years he suffered from defective eyesight, but otherwise kept well and retained his interest in botanical matters.

Schonland was much interested in education and played a big part in building up the University of South Africa, especially the Rhodes University College. His main interests lay in systematic botany, to which he made some valuable contributions. These included check lists of the plants of the districts of Albany and Bathurst (1907) and of Uitenhage and Port Elizabeth (1918). For monographic work he selected such difficult genera as *Rhus*, *Crassula*, *Cotyledon*, and the family *Cyperaceae*. He served for many years on the Advisory Committee for the Botanical Survey of the Union.

He was also keenly interested in phylogeny, plant distribution, and ecology, and he paid attention to practical matters, such as weed eradication and soil erosion. One of his most interesting papers was on the question of the origin of the angiospermous flora of South Africa*.

His reminiscences† of famous botanists included some about Prof. A. Engler, under whom he worked at Kiel University. He considered Engler to be far from being a good teacher, his lectures being delivered in a dry, halting manner as if he were not sure what he was talking about. Schonland explains that this was due to his huge knowledge of detail which was apt to overwhelm him and make it difficult for him to select what was suitable for his hearers. "He had none of the prejudices which are traditionally and perhaps rightly ascribed to the typical Prussian. When once one had shown him that one was in earnest, straightforward and not a fool, one had in him a friend for life." Schonland was evidently

*Trans. S. Afr. Phil. Soc. **18**: 321–367 (1907).
†South African Assoc. Advanc. of Sci. 1931.

a shrewd judge of character and his records of the characteristics of so famous a botanist as Engler are valuable. Other interesting papers were his criticism of Lotsy's Theory of Evolution*, and his summary of the distribution of the genera of South African Flowering Plants†.

Schonland was very loyal to his adopted country, and, as shown in his correspondence with Kew, condemned in round terms the ambitions of Prussian militarism which culminated in the war of 1914–18. His eldest son served in France and carried on research work in wireless telegraphy, training hundreds of officers during the war. He is now Professor of Physics at the University of Cape Town.

J. HUTCHINSON.

Silviculture of the trees of Trinidad and Tobago, British West Indies.‡—This book is of great interest both to the ecologist and systematist: to the former, because it represents the first attempt to map the vegetation of Trinidad and Tobago on modern ecological lines comparable with similar studies on the coastal forests of British Guiana; to the latter, because it gives him for the first time in convenient form a statement of the distribution and frequency of a large number of species of trees recognised in the various types of forests occurring in these islands.

The introduction, which occupies about 40 pages, is devoted to accounts of the physiography and vegetation of Trinidad and Tobago, followed by a section on the silviculture of the crop, and concluding with a list of trees arranged by families after the Bentham and Hooker system, the names being in two columns, one Latin, the other vernacular. Ecologists will find much to interest them in the definition and map of the various types of forest recognised by Mr. Marshall, although they will feel that it is all too short. It is obvious, as the author admits, that no clear description can yet be given of the vegetation of the Northern Range of Trinidad, which to many readers, if not to practical foresters, will always be the most interesting, as it is also the most inaccessible, part of the island; while almost nothing is known at present of the constitution of the forests of Tobago, where only a single association (*Carapa-Ocotea*) has so far been recognised. Mr. Marshall appears to use the terms "dominant" and "subdominant" for classifying the stratification of trees in the tropical rain forest, instead of for indicating their frequency in a given stratum or association. This seems unfortunate. On page xviii we have the following important sentence which is most awkwardly expressed and is just saved from unintelligibility by its punctuation: "The tallest trees forming the uppermost canopy reach a height of over 100 ft., often 150 ft. or more; this canopy is not continuous, the main canopy being formed by the

* South African Assoc. Advanc. of Sci. 1915: 257–265 (1915).

† Trans. Roy. Soc. S. Afr. 7: 19–58 (1918).

‡ By R. C. Marshall, B.Sc., M.A.(Oxon.), Dip. For. Oxford University Press, 1939. Pp. xlvii+247, 16 plates, 29 drawings, sketch-maps. Price 21*s*.

subdominants: dominated by these but still exposed to light is a lower stratum (the subdominants) consisting in the main of species differing from those occurring among the dominants." Similarly, this use of terms lands us on p. xxiii in a double oxymoron with the remark " Among the dominants *Trichilia oblanceolata* Rusby is commonly rare "!

The body of the work consists of descriptions of the trees, and contains a great deal of valuable and useful information classified under various headings in each description. The systematist will find that many species which seemed rare and were known to him only from poor and scanty herbarium material, with no notes as to their habitat and distribution, are quite familiar to the Forest Department of the Colony. The identifications and nomenclature follow those of the parts of the Flora of Trinidad and Tobago, as so far published. The trouble comes when we reach families of which the local material had not at the time been revised for that work. In dealing with some of these the author—in spite of remarks in his preface—has apparently not attempted to consult any competent systematist and when confronted with special difficulties, as in the important family *Sapotaceae*, has been forced to query some of his accepted names and to leave other trees completely unidentified. This inevitably mars the value of the book, and should have been avoided by persistently calling in the help of the Kew Herbarium, which exists for this very purpose. The identifications and nomenclature of the whole work could also have been revised there in the light of the most recent critical studies. [No doubt Mr. Marshall's transfer to the Gold Coast, while the book was in preparation, prevented him from submitting material from Trinidad for verification.—*Ed.*] This, in these days, very necessary " co-ordination " was worth the little extra trouble and time which would have been involved for the perfecting of a book which has been given a splendid format and is illustrated with attractive drawings and photographs.

N. Y. S.

To the forester the most interesting part of Mr. Marshall's work is, of course, that comprised under the heading " The silviculture of the crop," which epitomises the information he has accumulated during the eleven years of his service as Conservator of Forests, Trinidad and Tobago. This compilation will serve as a very useful guide to those concerned with forestry in those islands. In view of the short period during which scientific forestry has been applied in this region, it is not to be expected that there should be a great body of specialised silvicultural knowledge available, and it is soon apparent on studying this volume that there is still everything to be ascertained about the silvicultural requirements of most of the trees. Nevertheless, the author has brought together much valuable knowledge concerning the more important forest species and a little about many others.

The facts are classified under sections devoted to: distribution and habitat; germination; seeding; silvicultural characteristics; natural regeneration; artificial regeneration; and utilisation.

C. E. C. F.

Botanical Magazine.—Part 1 of Vol. clxiii of the Magazine was published on 12th August and contains the following plant portraits:—

Bomarea Carderi Masters (t.9601), from Colombia; *Eugenia cyanocarpa* F. Muell. ex Maiden & Betche (t.9602), a native of New South Wales and S. Queensland; *Trachelium lanceolatum* Gussone (t.9603), Sicily; *Acacia podalyriifolia* A. Cunn. (t.9604), from Southern Queensland; *Coleus Autrani* Briquet (t.9605), a native of Abyssinia, raised from seed collected by Captain E. M. Erskine near Goré; *Cleyera japonica* Thunb. var. *Wallichiana* (DC.) Sealy (t.9606), found from W. China to Nepal; *Tulipa Bakeri* A. D. Hall (t.9607), a native of Crete; *Verbascum banaticum* Rochel apud Schrader (t.9608), distributed from Rumania to Greece; *Rhododendron floribundum* Franchet (t.9609), found in W. Szechwan and E. Yunnan; *Petrocosmea nervosa* Craib (t.9610), a native of S.W. China; and *Gonolobus fulvidus* F. Ballard (t.9611), from British Honduras and Guatemala, a newly-named plant originally placed under *Vincetoxicum*.

Dioscorea " pichinchensis " *R. Knuth* in Engl. Pflanzenreich, IV. 43, p. 57 (1924). This species was based on a holotype, *Spruce* 3716, ann. 1854, in the Kew Herbarium. The author was insufficiently familiar with the English cursive to be able to decipher Richard Spruce's scrupulously neat handwriting, with the result that Caño Pimichin was misread as " Pichincha [?]," the well-known Andean mountain above Quito, in Ecuador. Caño Pimichin is, of course, in low-lying Amazonian Venezuela, and is the site of the famous portage connecting the upper Rio Negro with Javita and the Rio Temi, and thus with the Orinoco viâ the Rio Atabapo. No botanist acquainted with the history of Spruce's travels, so carefully recorded and edited by A. R. Wallace in " Notes of a Botanist on the Amazon and Andes," could possibly have supposed that a specimen numbered below 4,000 and dated June 1854 had been collected in Ecuador. In the interest of all taxonomists, and particularly of those who may study the flora of Ecuador, it is necessary to call attention to this error, so symptomatic of the more mechanical type of monographic work, and to propose the corrected name **Dioscorea pimichinensis** *R. Knuth* in Engl. Pflanzenreich, IV. 43, p. 57 (1924), sphalm. *pichinchensis*.

N. Y. SANDWITH.

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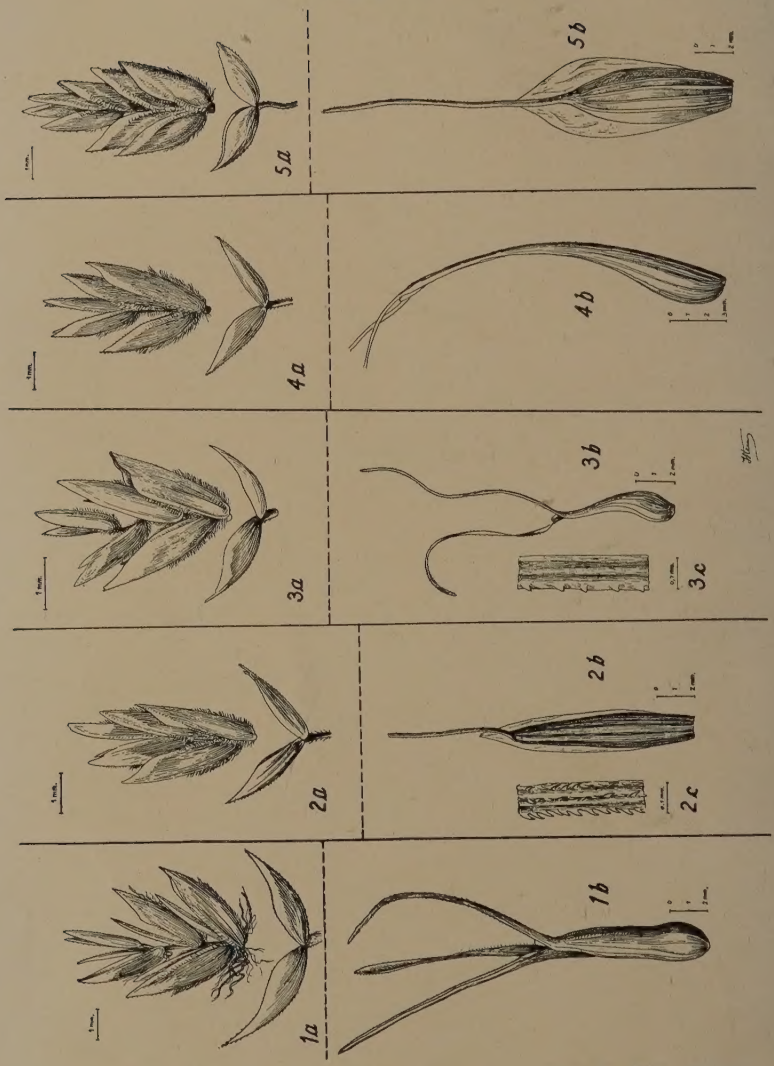
PLATE VII



1. *Poa bulbosa* L. 2. *P. sinaica* Steud. 3. *P. Eigii* Feinbr.
4. *P. Hackeli* Post. 5. *P. Timoleontis* Heldr.

a. Spikelet. *b*. Bulb or sheath or radical leaf with ligula.
c. Portion of lamina showing scabrosity.

[*To face page* 277.